



# twogether

Paper Technology Journal

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*Dr. Hans-Peter Sollinger,  
Member of the  
Management Board  
Voith AG and President  
of Voith Paper.*



### **Dear customer, dear reader,**

*How do paper manufacturers deal with waste materials? With the increasing use of recovered paper, this question has been gaining importance worldwide in the last few years. Our title story shows how the Palm paper mill found an answer to this question. With a multi-location concept, Palm uses waste materials as a valuable source of energy. The result: not just lower energy costs, but also lower disposal costs.*

*Savings remain an important topic in the paper industry. For that reason, we at Voith Paper are constantly working on offering our customers products and services that generate savings. Often small investments are rewarded with a high return on investment. An example of this is the SizeWings AT component, which gets size presses going (p. 34), or the OnV PaperVision camera system, which prevents breaks and at the same time saves on operating costs (p. 46).*

*So that you can grasp the specific benefit of individual products and services from Voith Paper at a glance in the future, we've introduced new symbols in the magazine. In this way, you see whether the product has an*

*effect on the paper quality, for example, or whether it protects the environment. You can learn more about this from page 26 on.*

*Innovations require a great deal of courage. In the twogether interview, our customer Dr. Jan Klingele tells us why he was ready to be courageous with Voith Paper. His company, the Klingele Group, was the first to use the new BoostDryer drying technology. The results of this project and what he expects of the future can be found on page 32. We would like to take this opportunity to thank Dr. Klingele for the interview.*

*We bring into play our entire knowledge base and all our commitment for the satisfaction of our customers. Therefore, we are happy when we can look back at successful projects. Just three examples are projects with SEPAC in Brazil (p. 16), with Rhein Papier in Germany (p. 18) and with Sappi in Belgium (p. 23).*

*I wish you lots of interesting reading!*

*H. P. Sollinger*

*on behalf of the Voith Paper Team*





**Heaps of plastic, mountains of sludge and coarse impurities such as metal were a considerable cost factor for disposal, until recently. Now some paper mills are using their rejects and residual materials as potential recyclables for energy production. The Palm paper mill has built a facility using state-of-the-art technology at its Würth location in Germany.**



Paper machines and stock preparations are subject to a constant optimization process. Over the last few years, energy production and the peripheral processes such as disposal of rejects and residual materials have gained considerable significance. “Paper manufacturers still have a remarkable potential in the recycling of residual materials for reducing costs and increasing the profitability of their production,” says Lucas Menke, Manager at Voith Paper Environmental Solutions (VPES).

Residual materials and rejects can no longer be conveniently and easily disposed of, as was still the case only a few years ago. But due to the increased use of recovered paper, their portion is increasing. In Europe, for example, the paper industry used around 53.3 million tons of recovered paper for paper production in 2007. By comparison, consumption of recovered paper was around 50 million tons in China and 30 million tons in the USA. Worldwide, around 208 tons of recovered paper were consumed; that corresponds to a utilization rate of 53%.

The high utilization of recovered paper and thus higher portion of residual materials lead to increasing disposal and landfill costs. Stricter waste management laws in many countries further tighten the situation. “With a system for processing residual materials, paper manufacturers can not only save these disposal costs but also obtain energy at the same time and thus noticeably lower their energy costs,” explains Dr. Andreas Haas, Director of the Planning



*“With a system for processing residual materials, you can not only save these disposal costs but also obtain energy at the same time and thus noticeably lower their energy costs.”*

Dr. Andreas Haas, Director of the Planning Department at the Palm paper mill.



Residual materials and rejects		
Rejects (high-calorific, easily combustible waste)	tails/pulper rejects	consist mainly of film and are connected with iron wires due to the process design
	rejects/coarse rejects	sorting residues, e.g., wrong insertions in recovered paper collections, CDs, film packages, high fuel value
Residual materials (low-calorific waste)	deinking sludge	sludge that arises from the separation of fibers and printing inks, low fuel value
	mixed sludge	sludge that accumulates from the process stages of cleaning, sorting and deinking, low fuel value
	bio-sludge	sludge that accumulates from the aerobic stages of the biological clarification plant, low fuel value

Rejects and residual materials are differentiated according to fuel value and physical composition (size, dry content). This classification then also defines the sequence of pretreatment.

Department at the Palm paper mill. Palm, the German paper mill, reacted to the challenges by building the most modern system for recycling residual materials in the world. We took a closer look at how the system functions and its advantages.

**Multi-location concept**

Annually, the Palm paper mill produces altogether 600,000 tons of newsprint

and energy concept. The core of the new system is a gas and steam facility running on natural gas that has been in operation at the Wörth location since 2008. It is supplemented by a residual material boiler that burns nearly all residual materials from the three production locations. So far, the facility is unique worldwide and the most modern of its kind. Eltmann and Aalen, the headquarters of the group, deliver their residual materials to Wörth.

of companies has made itself widely independent of external disposal companies.

The foundation of the new system was a thorough investigation of the accumulating reject and residual material flows from all three mills, looking at their quality, degree of contamination, foreign matter, degree of dewatering and absolute quantity.

*“In 2005, we disposed of all rejects and residual materials via third-party companies, which cost several million euros annually.”*

Dr. Andreas Haas, Director of the Planning Department, Palm paper mill

in Aalen and Eltmann and 890,000 tons of corrugated cardboard base paper in Aalen and Wörth – all from 100% recovered paper. The company has found a solution for the accumulating waste and included its three German locations in a comprehensive waste

“In 2005, we still disposed of all rejects and residual materials with costs to third-party companies, which cost several million euros annually,” says Dr. Andreas Haas. Today, the waste produces energy, and within three years the group

Wörth is the largest location with an annual production of 650,000 tons of paper. Since Wörth thus has the highest energy consumption of the three locations, Palm installed the new power plant technology there.

**Energy from residual materials**

With the gas and steam facility and the residual material boiler, steam and energy can be produced from the combustion of rejects and residual materials.

the goal of the integrated paper mill,” explains Lucas Menke. That means striving for a raw material and energy cycle in paper production that is as closed as possible. In Palm’s case that means all residual materials

rejects, tails and heavy parts are sorted out in the stock preparation and wastewater treatment area of the paper mill. Metal, iron and aluminum remain at the location for scrapping. However, the combustible residual materials start their journey to Wörth:

*“With our system, we are pursuing the goal of an integrated paper mill.”*

Lucas Menke, Manager at Voith Paper Environmental Solutions

Meri, a Voith Paper company, supported Papierfabrik Palm in planning the new facilities, utilizing its expertise in process technology and mechanical engineering for the residual materials treatment that was required in this project. “With our system, we are pursuing

are sorted and used for energy production.

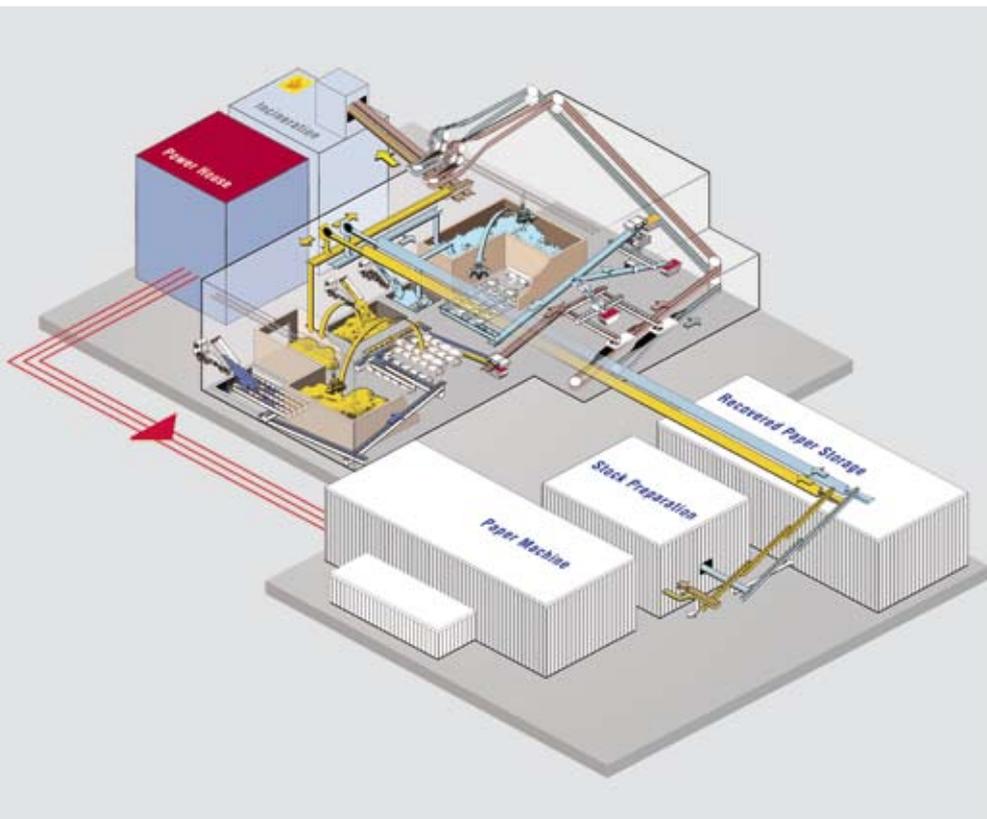
**The journey of the residual materials**

We accompany the residual materials from Aalen, and sludge, getter,

large claws, buckets or conveyor belts put them in transport containers that are loaded on trucks. Then it’s off to Wörth. Soon, they will be transported by rail with a newly developed special transport container system. Once they arrive there, the individual fractions are tipped into various pits called residual material pits.

First, a modern shredding facility in Wörth shreds tails, coarse rejects and fractions from the dissolution directly in the stock preparation. Ferrous metals are separated from the material flows with the aid of a magnetic separator.

The accumulating fiber residues, fillers and sludge from wastewater treatment are dewatered for the highest dry content. Two systems running in parallel then convey the fractions with high fuel value (dissolution rejects) and mixed sludge and fiber sludge with low fuel value over about 200 meters of carrier air conveyors to the residual material storage or to the power plant. If one conveyor fails, the other is available. The conveyed residual materials can either be directly burned without interim storage or



*Preparation of the various rejects and residual materials (left) for combustion is today an important part of a modern integrated paper mill and contributes substantially to profitability.*



*Shredding and metal separation is the precondition for combustion of the high-calorific rejects.*



*An intelligent self-propelled crane system takes fuel out of storage and feeds the secondary treatment stages, mixing and feeding systems.*



*A closed pouch belt conveyor also allows fuel transport on complicated stretches.*

temporarily stored in the residual material storage. The amount of residual materials that come from Aalen and Eltmann varies due to production and logistics of the plants.

“We designed the storage concept in such a way that larger amounts of residual materials can be stored in order to have a suitably good supply of fuel,” explains Dr. Haas.

### **The mix is what does it**

An intelligent crane system can remove partial amounts from the high-calorific fuel (rejects) and low-calorific fuel (mixed sludge) stored in the residual material storage and feed the secondary systems.

The secondary system for sludge allows mixing and homogenizing of the low-calorific fraction from which, in addition, metallic impurities are separated. The secondary system for rejects has several process steps: first magnetic separation, shredding, second magnetic separation, separation of non-ferrous metals, e.g., aluminum and extremely small iron particles. Depending on the requirements of the power plant, the two fuels can be mixed so that the fuel value required by the power plant is obtained. The mechanical engineering solutions delivered by Meri and described above also allow adaption to fluctuations in the quality of individual fuels to meet the power plant's requirements. For the first time, a pouch belt conveyor system was used for conveying this fuel material.

**Main suppliers**

**Residual material preparation, storage and feeding system:**  
Voith Paper Environmental Solutions

**Power plant:**  
Austrian Energy & Environment

**Power plant planning & engineering:**  
EPROPlan Stuttgart



Dr. Wolfgang Palm, owner and Executive Director of the Palm paper mill (left), enthusiastically cuts the special gift from Meri at the official opening ceremony in Wörth at the end of April 2009. He is assisted by Dr. Andreas Haas, Director of the Planning Department at Palm (right).

With the new materials handling equipment, it is possible to implement challenging routes (inclines, corners) with a closed system – a big advantage.

“The system is sophisticated,” reports Dr. Haas. “If the desired fuel mixture ratio cannot be kept within the defined limits even just for two minutes – for example, due to obstruction or material change – the fuel is automatically transported back

into the residual material storage and remixed there.” EDP ensures that both types of material, the low-calorific sludge and the high-calorific rejects, are uniformly broken down.

**Boiler with optimum efficiency**

Now the new system has been running for a few months, Dr. Andreas Haas sums it up: “With the residual material boiler and the gas and steam facility, we produce our energy completely by

ourselves and avoid expensive disposal.” Did the investment pay off? “Definitely,” says Dr. Haas. “We would immediately install the system again just like this. The waste and energy system absolutely pays off.”

**Contact**



**Lucas Menke**  
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*“We would immediately install the system again just like this. The waste and energy system absolutely pays off.”*

Dr. Andreas Haas

**Possible savings in waste disposal costs in Europe**

<b>Recovered paper use:</b>	<b>53,3 Mio t/year</b>
<b>Rejects and residual materials that are created:</b>	<b>2,9 Mio t/year *</b>

**Possible savings in waste treatment: 139 Mio euro/year \*\***

\* In the board and packaging area, between 3 and 8% residual materials are created. For calculation purposes 5.5% was assumed.

\*\* The price fluctuates between 30 and 65 euros. For calculation purposes, waste disposal costs of 48 euros per ton were assumed.

**Note:** This can only be implemented in about 1/3 of the systems, generally with several interconnected plants.



*The first paper machine in India with the online coating method – Bhigwan PM 2.*

## Bhigwan PM 2 with online coaters sets new standards

### Unique in India

**The new PM 2 of Ballarpur Industries Limited (BILT) in Bhigwan, in the state of Maharashtra in India, is setting new standards for graphic coated paper. Bhigwan PM 2 is the first and so far the only paper machine in India featuring the online coating method. Ultimately, BILT decided in favor of the online method because, along with lower investment costs, it also has lower operating costs.**

BILT operates the Voith PM 1 offline machine at the same location very successfully and can, therefore, directly compare the two methods daily.

BILT, as part of the approximately US \$3 billion Indian group Avantha, is India's largest paper manufacturer and one of the most efficient producers of printing and writing paper. At

the five production locations throughout the country, BILT produces more than 50% of the wood-free coated paper needed in India. In doing so, an annual output of over 500,000 tons of pulp and paper is achieved. BILT is thus among the top 100 of the largest paper manufacturers worldwide. After discussing an offline coating method initially, and a wider machine, BILT

and Voith ultimately agreed on a narrower Perfect Fit online variant. It met the market requirements in India. The extensive technical discussions and negotiations with BILT's technical team stretched out for over a year altogether. On March 22, 2007, the negotiations ended with the signing of the contract for supply of the Bhigwan PM 2 production line.

## Large delivery

Voith Paper's delivery includes the entire line, starting with stock preparation, the approach flow system including broke preparation, the complete paper machine with auxiliary equipment and the online coating machine all the way to finishing with the offline Janus calender and VariFlex winder.

Stock preparation includes both preparation lines for short and long fibers that are equipped with TwinFlo double disc refiners. Mixed tropical hardwood from sustainable timber stands and pine are primarily used as the raw materials. The raw material is supplied on the one hand via market pulp and on the other from their own pulp production. Sabah Forest Industries (SFI) in Malaysia, which was recently acquired by BILT, also ensures a more independent and sustainable supply of raw material. It operates a pulp mill on Borneo in the Sipitang Province in Malaysia and, at the

same location, two older paper machines, manufactured in 1988.

The entire wet end process, i.e. the approach flow system including TurbAir vacuum system, broke preparation, fiber recovery, headbox pump and also process pumps and the complete instrumentation are also included in Voith's delivery. Together with the basic engineering originating from Voith and the excellent teamwork with BILT, this allowed optimal coordination and integration of all process components. The result was a speedy and successful start-up in December 2008.

The structure and design of the PM 2 is modeled heavily on the world's largest wood-free coated paper machine, the Dagang PM 3 in China. There are differences though, especially in the area of width and machine speed and also in the former. The Bhigwan PM 2 is equipped in the front wet end with a ModuleJet headbox and DuoFormer D for the best formation.



*Stock preparation includes both preparation lines for short and long fibers.*

## The press concept was also convincing

The Tandem NipcoFlex press was selected for low two-sidedness of the paper, high dry content after the press with the lowest possible volume loss and the highest runnability. Like the online coating method, this press concept is a novelty for India and first had to win over the technical team at BILT.

In addition, the single-tier TopDuoRun pre-dryer section, the 1x2 EcoSoft calender and the SpeedSizer used for precoat and sizing are included

### Technical specifications

#### Bhigwan PM 2

Paper grades:	online wood-free coated (single and double), wood-free uncoated
Production capacity (gross):	655 tons / 24 hours (based on 100 g/m <sup>2</sup> )
Wire width:	5,400 mm
Max. paper web width at the reel:	4,810 mm
Design speed:	1,100 m/min
Max. operating speed:	1,100 m/min
Raw material: bl. short-fiber pulp	70 - 85%
bl. long-fiber pulp	15 - 30%
filling	10 - 15%



*The DuoFormer D provides for the best formation.*



*A 10-roll Janus MK2 calender provides for optimum surface treatment.*

*The successful start-up team in Bhigwan.*

in the delivery. Finally, the online dual top coat coating machine followed the flotation dryer and the two-tier CombiDuoRun after-dryer section. Here DynaCoat AT coaters with JetFlow technology for optimum coat application are used.

In addition to the main components, auxiliary equipment such as hood technology, steam and condensate systems, central oil lubrication, paper web run, edge trimming preparation and splash water system are also part of Voith's delivery. A 10-roll Janus

MK2 calender provides for optimum surface treatment after coating. The sophisticated and stable 45° design allows the quickest roll changing times and partial deadweight relief in the nip. The VariFex winder with its two specially rubberized reel drums is responsible for optimum reeling conditions during winding of the secondary rolls.

**Speedy start-up possible**

In addition to the proven machine units, there was also the entire control

system (MCS/ DCS) and quality control system (QCS) of the machine, including five scanners from Voith. That was advantageous for the smooth and speedy start-up, since there were hardly any interfaces with an external system. Initial general coordination problems with optimizing the drives of the customer's motor supplier, especially in setting the "pulls" in the various areas, were eliminated through the cooperation of all parties.

The machine operators who were originally accustomed to various



*Customers visit Voith Paper in Heidenheim, Germany (from left to right):*

- Joachim Huber, Regional Account Manager Asia;*
- Dirk Thomas, Start-Up Engineer;*
- R.R. Vederah, Managing Director BILT;*
- Kurt Brandauer, CEO of the Division of Paper Machines;*
- SK Khurana, Senior Vice President Projects & Engineering;*
- Carl-Heinz Becker, Project Manager;*
- and Manfred Wagner, Project Manager.*



*The DynaCoat AT with JetFlow technology provides for optimum coat application.*

external units were won over by the easy operability of the Voith Automation solution. The customer's personnel were all intensively trained for the start-up and to maintain lasting success for the project. An extensive training program was carried out for the future operating and maintenance personnel by start-up supervisor, Peter Spreng, and other Voith experts. About 13 months after the contract came into effect, installation of the PM started in May 2008 and successfully concluded after seven months on November 28,

2008. Twenty days after installation was completed, the start-up was authorized and at the beginning of April 2009 the operation test run requirements for wood-free coated paper were already met. Along with the extremely professional and cooperative collaboration between BILT and Voith, Voith's Indian joint venture partner of several years, Larsen & Toubro Limited (L&T), also contributed to the successful installation of the new Bhigwan PM 2. From the Kansbahal plant in the state of Orissa in India, L&T supplied essential parts of the dryer section, especially the machine frame and also dryer cylinder and various other rolls and parts of stock preparation, all the way to the calender machine frame.

Now, due to the Bhigwan PM 2, BILT can further expand its market leadership in India and together with Voith has created a showpiece for online coated wood-free paper production in India. Production capacity for wood-free coated paper at the Bhigwan location can now be increased from the previous 125,000 to 315,000 tons per year.

## Location

### India



The city of Bhigwan in the state of Maharashtra in India has about 9,000 residents. The BILT paper mill is 5 km outside the city. Baramati, a gold and silver city with a large industrial area and about 100,000 residents, is 40 km from Bhigwan.

## Contact



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*"We look to the future with confidence and are sure that this successful project will advance our economic success."*

*R.R. Vederah, Managing Director*

*"Since start-up, the performance of the PM 2 has completely met the high aims that we set when selecting Voith as our machine supplier. Along with their partnership during the design phase and prompt completion, Voith also supported us in the further development of paper qualities. We look to the future with confidence and are sure that this successful project will advance our economic success."*



The VTM 2 tissue machine at SEPAC.

Dr. João Ferreira Dias, President of SEPAC (left) and Nestor de Castro, President of Voith Paper South America (right) in front of the VTM 2.

Standardized tissue machines ensure cost-efficient production

## SEPAC relies on tissue technology from Voith

**Voith Paper has defined five standardized machine types for tissue production which lead to cost-efficient production. At the same time, they meet the high quality standards that the market demands. At SEPAC in Mallet, located in the state of Paraná, Brazil, a tissue machine of the type VTM 2 has been successfully producing high-quality tissue paper since summer 2008.**

	VTM 1	VTM 2	VTM 3	VTM 4	VTM 5
Web width at the reel [mm]	2,200-2,800	2,700-3,000	2,700-3,600	2,700-5,500	4,500-5,600
Design Speed [m/min]	1,300	2,000	2,200	2,200	2,400
Yankee diameter [m]	3.66	3.66 4.57 4.88	4.57 4.88 5.49	4.57 4.88 5.49	5.49
Production at the reel [to/day]	75	125	150	230	245

With the aim of making tissue machines even more cost-efficient, Voith Paper defined standardized machine types for tissue production. The requirements of various customers worldwide can be met within this range. In addition, economical production with high quality standards is made possible.

Altogether, five standard tissue machines from the VTM 1 to the VTM 5 are offered. The main differences are in the machine widths and the size of their Yankee cylinders, which result in different speeds and production quantities (Fig. 1).

This standardization is of special significance for markets in emerging

Fig. 1: Standardized machine types for cost-efficient production.

countries and developing countries such as in Latin America, Asia and Eastern Europe. But it is also important for markets with high cost pressure such as Western Europe. Here, the need for the most technologically modern systems with simultaneously reduced investment budgets has to be met.

A perfect example of the competitiveness of standardized Voith tissue machines is the new VTM 2 standard machine, which was sold in May 2007 to SEPAC, a fast-growing tissue producer in Brazil. The VTM 2 was designed for a speed of 1,600 m/min and a working width of 2,760 mm. It produces up to 80 tons of tissue paper per day.

Among the main components of this system are the Crescent former and the new single-layer MasterJet II T headbox which was specially developed for optimum formation. In addition, among the key components are a suction press roll in the press section, the well-known 4.57 m

Voith Paper Yankee cylinder and the standardized MR 100 reel with hydraulic primary and secondary arms.

Thanks to the outstanding teamwork between SEPAC and Voith Paper and the efficient project coordination during the construction phase and also during start-up, the system successfully went into operation on July 6, 2008. Since then, SEPAC has continuously increased the production speed towards 1,600 m/min and has produced tissue paper in the basis weight range of 14 to 35 g/m<sup>2</sup>. A new product from SEPAC is part of this: two-ply toilet paper.

This successful project has strengthened the relationship between SEPAC and Voith even further and shows that Voith Paper is on the right path with the standardization of tissue machines. The significant cost reductions through standardization allow globally cost-efficient tissue machines to be offered with the most modern technology.

## Location

### Brazil



The small city of Mallet, with 13,200 residents, is in the federal state of Paraná in Brazil. Curitiba, the capital city of Paraná, is 230 km away.

### Contact



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*“SEPAC is now prepared to meet the increase in demand for high-quality tissue paper on the Brazilian market.”*

*Dr. João Ferreira Dias, President SEPAC*

*“Due to the excellent performance of the new Voith Paper tissue machine, we were in a position to increase our production capacity to 72,000 tons/year and noticeably improve the quality of our products. SEPAC was thus able to develop a unique product range and expand into new market niches such as two-ply toilet paper. SEPAC is now prepared to meet the increase in demand for high-quality tissue paper on the Brazilian market.”*

World record for efficient stock preparation set at Rhein Papier in Hürth

## Combiscreening helps exceed targets

**The PM 1 paper machine from Voith Paper runs at full speed at Rhein Papier, where, in March 2009, it set a world record of 2,010 m/min. To achieve this production level, Voith Paper set up an effective new Combiscreening arrangement for stock preparation, at little expense.**

Since 2002, the Myllykoski Group has produced newsprint made of 100% recycled paper on the PM 1 at their Rhein Papier plant in Hürth. Although only in its first years of operation, the paper machine had already tapped its full speed potential by 2005, and the stock preparation system could no longer keep pace with the machine. As the machine's production capacity increased and stock preparation lagged, more impurities accumulated. The result was operational malfunctions and increased maintenance work.

An analysis by Voith Paper and Rhein Papier found a bottleneck in the three-stage hole screening arrangement. Up to that time, the screens had perforated cylinders with a 1.0 mm hole diameter. In addition, reject lines, valves, and screens were overloaded.

However, the arrangement, in concert with the fine screening at Rhein Papier, experienced very good removal efficiency, including effective stickies removal.

"Our challenge was to maintain the quality of the stock at a higher production quantity," reports Guido Clemens, Director of Technology at Rhein Papier.

### Combiscreening instead of hole screening

Voith Paper found the solution in combiscreening. It combines robust, two-stage hole screening with effective slot screening, and it no longer requires two slot-screening arrangements in full stream.

The Combisorter, coupled with a cleaner, was installed as the only

new machine in pre-screening. It forms the intelligent link between hole screening and slot screening, removes all coarse impurities, and calibrates the stock for treatment with fine slots. The two first-stage screens remain unchanged, while the screens of the second and third stage now form the slot-screening arrangement, coupled in partial stream. They are equipped with the FiberLoop, which decreases rejects thickening and reduces fiber loss, in the new third and fourth stages.

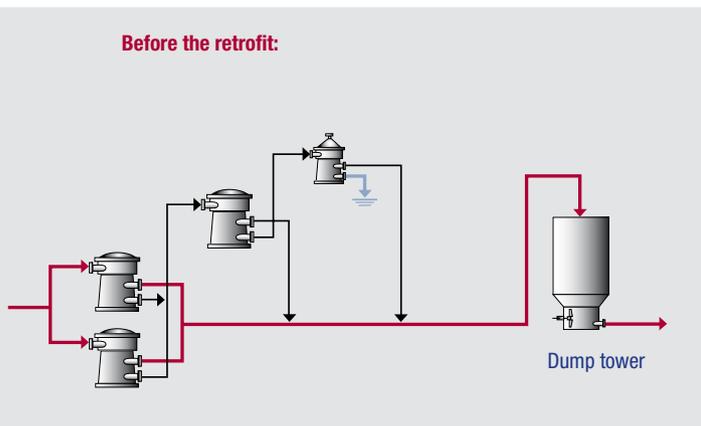
The Combisorter has already proven itself several times in graphic paper and packaging systems. Its application to stock prep in Hürth was quickly successful as well: Since the autumn 2007 retrofit, production capacity of pre-screening is up to 20% higher than before. In addition, flotation was optimized. Stock

*Richard Thalhofer (left) and Guido Clemens (right) in front of the new Combisorter.*

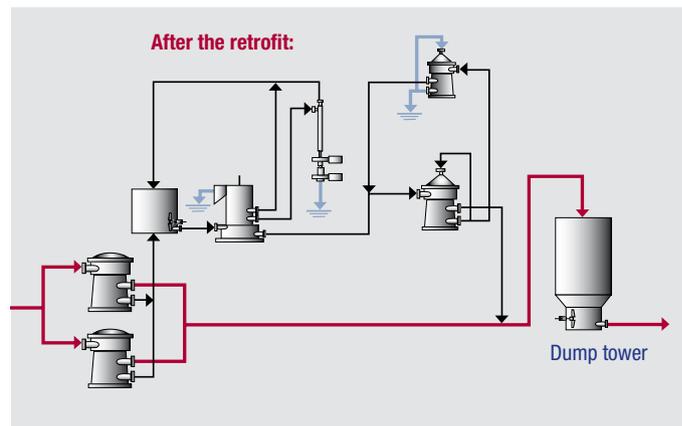


*"What impresses me is that Voith Paper very effectively implemented the changes in stock preparation with little expense."*

Richard Thalhofer, Process Engineer in stock preparation, Rhein Papier



Before the retrofit: hole screening as pre-screening.



After the retrofit: Combiscreening as pre-screening.

preparation now exceeds the 1,000 tons per day that Rhein Papier had aimed to achieve. By comparison, the previous best result was 880 tons per day.

**Records celebrated**

“We have not only maintained the quality of the stock, but even improved it: Sticky removal in pre-screening improved by about 30%,” sums up Guido Clemens.

Even critical impurities, such as Styrofoam™, are effectively removed. The two end stages of hole screening, the Combisorter and the Multi-Sorter, can be set to handle whatever impurity range comes up. Stock

consistencies and overflow rates can drop by approximately 20% overall.

“What impresses me is that Voith Paper very effectively implemented the changes in stock preparation with little expense,” says Richard Thalhofer, Process Engineer in stock preparation at Rhein Papier. “We had low investment costs and low retrofitting expenses. At the same time, the specific energy costs have not risen.”

Along with the stock preparation retrofit, Voith implemented additional upgrades to optimize the PM 1. It did not take long to set records: In 2008, Rhein Papier surpassed its production target with a record annual

tonnage of 302,000 tons. In April 2008, the PM 1 reached world-record speed with 1,980 m/min over 24 hours. At the beginning of March 2009, the bar was raised even higher with 2,010 m/min.

**Location**



The city of Hürth is in North Rhine-Westphalia, just 9 km from Cologne. It owes its origin to the development of the Rhenish brown coal district at the end of the 19th century. Today, along with large-scale industry, the media are among the significant economic factors in this city of 60,000 residents.

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*“We have thus not only reached our targets, but exceeded them.”*

Guido Clemens, Director of Technology at Rhein Papier

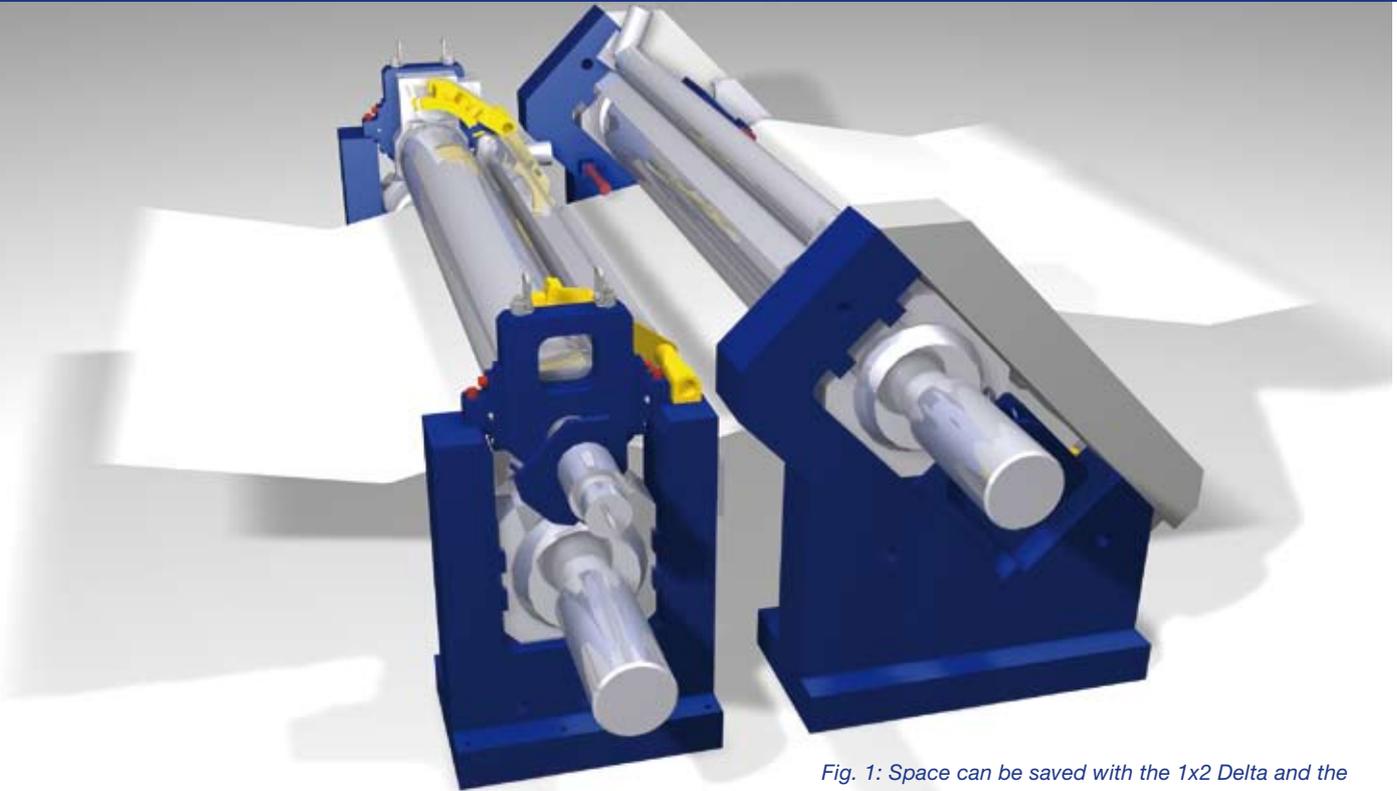


Fig. 1: Space can be saved with the 1x2 Delta and the 1x2 V-framing of the EcoSoft calender.

Tapping potential for improvement on calenders

## Satinage made to measure

**Good printability, optimal running characteristics and outstanding visual characteristics are the essential requirements for modern paper. Today, many calenders are no longer up to these requirements without undergoing some modernization. Two current cases show how calender rebuilds are planned exactly according to the needs of the respective customer.**

### Case 1: Palm paper mill, Eltmann plant

Standard newsprint (coldset offset) was for a long time the successful focus of the PM 1 in Eltmann. To ensure competitiveness, it ought to be possible in the future to produce an additional grade, newsprint for heatset offset.

### Experiments at the Paper Technology Center in Krefeld

As preliminary steps, extensive experiments were carried out with

the customer's paper at Voith Paper's Paper Technology Center in Krefeld (Fig. 2).

As a result, the Voith satinage specialists recommended a configuration of the EcoSoft calender with 2x2 rolls. To be sure, this solution did not require an additional steam moistening unit – however, difficult conditions resulted due to the additional space requirement. In the end, a 2x2 solution had to be fitted in place of the smaller, old 1x2 roll calender.

### Making best possible use of little space

The solution was optimal utilization of the existing space through a combination of a 1x2 Delta and a 1x2 V-framing (Fig. 1). In addition to this, the reel spool was moved 2.5 m in the direction of the winder. With simultaneous adaptation of the pulper under the reel, the space needed for implementation was provided. The EcoSoft calender was equipped with water-heated FlexiTherm rolls and deflection compensation rolls of the Nipcorect FX type. Well-preserved

components of the old calender system were integrated into the new calender concept. The other components were newly designed and manufactured.

### Successful course of the project

The calender was completely preassembled, put into operation and tested before being transported to the installation site. Already five weeks before the planned downtime of the PM, the first system units were assembled parallel to production. As much as possible, they were piped, electrically connected and preliminarily put into operation. In addition, to support the site supervision and to ensure that there was no delay, 24-hour stand-by on call service of all departments was set up. The PM 1 went back into production after only 8 days of downtime. All deadlines were met; the PM started up promptly and produced the first reel spool with marketable paper on the afternoon of the same day.

### An impressive result

All goals were achieved with regard to paper technology as well. The system now produces newsprint for coldset



Fig. 2: Combination test facility at the Paper Technology Center in Krefeld.

offset and, alternatively, newsprint for heatset offset. Use of the deflection compensation roll subdivided into 32 zones allows a CD caliper profile of 2 Sigma < 0.7.

### Case 2: Kübler & Niethammer, paper mill Kriebstein AG

This case as well shows how an individual customized calender rebuild can noticeably increase one's competitiveness. Since the LWC papers of the PM 1 based on recovered paper was an outstanding sales engine for Kübler & Niethammer, the management decided to further strengthen this grade segment. A decisive factor was the further increase in the quality or gloss level. For this purpose, the coat color formulation was changed in a first step. The

measures introduced did show improvements, but were not sufficient to lift the gloss level from 35-40% according to Gardner to the desired 46%. Voith was commissioned with investigation of the possible solutions.

### Preliminary investigations confirm the assumptions

It quickly became clear that the existing calender was not up to the higher requirements and that in the end only a fundamentally new calender concept could do justice to the new tasks. Experiments at the Paper Technology Center in Krefeld confirmed this judgment. An important secondary condition in the implementation of the project was to continue using as many parts of the existing calender as possible. Within the



*"Our trust in Voith was warranted."*

*Helmut Liesen, Operations Manager PM 1, Palm, Eitmann*

*"Our requirement of being able to produce newsprint for coldset and heatset with our calender was high. Our trust in Voith was warranted. The qualities we require can now be easily produced by the rebuild calender."*

framework of a detailed analysis of the system, considerable optimization potentials were discovered in the threading process of the calender. After consultation and discussion of the possibilities, the customer decided to make use of these potentials and expanded the project accordingly.

**A completely new concept**

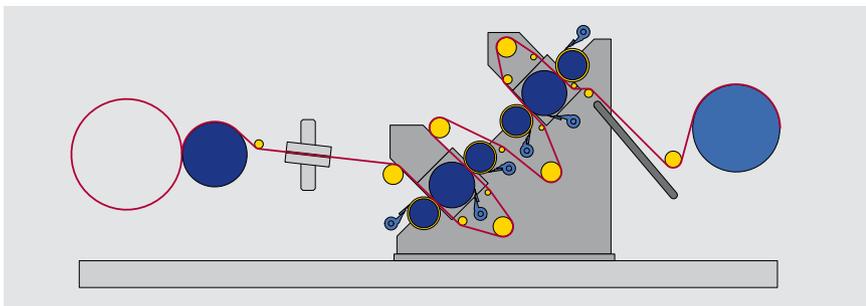
The new calender concept envisioned a modern 2x3 roll Janus MK2 calender. Existing deflection compensation rolls, FlexiTherm rolls and the main drive of the existing calender were integrated. Even parts from previous rebuilds such as oil heating, edge trimming and bearing lubrication can be found in the new concept (Fig. 3).

**On target in eight days**

The specified deadline of eight days for assembly and commissioning of the calender and the threading system could not be exceeded. Complete preassembly and – as far as possible – functional tests of all new parts assured an orderly course of events.

The rebuild of the existing calender and the installation of the threading system took place with high precision. All projected completion dates were kept. Already seven hours after start-up, the first reel spool was produced on the PM and the second reel spool proved to be marketable.

Fig. 3: Rebuild concept for the Janus calender.



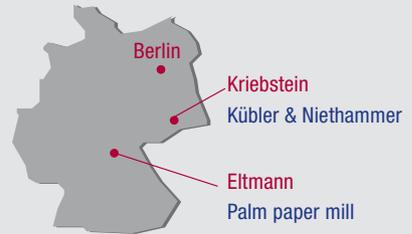
*“In Voith, we see a strong and reliable partner.”*

*Klaus Ziege-Bollinger, Chairman of the Executive Board, Kübler & Niethammer*

*“We are very satisfied with the rebuild that was carried out. Our expectations have been met without exception. We felt relatively secure and well-advised during the project phase. The measurable results now confirm this feeling. The gloss level of the paper produced was raised to exactly 46%. Downtimes due to paper breaks were substantially reduced by means of optimizations of the threading system. In Voith, we see a strong and reliable partner on whose competence we will certainly rely in future cases.”*

**Locations**

**Germany**



**Kriebstein:** The township of Kriebstein, with approximately 2,500 residents, is in the district of Mittelsachsen. The medieval castle and the Kriebstein dam attract thousands of visitors annually to this area.

**Eitmann:** The city has around 3,400 residents and is in Bavaria’s district of Lower Franconia. The township in the Main valley is regarded as the northern entrance gate to the Steigerwald Nature Reserve.

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Article Kriebstein



Modular control system rebuilds for winders

## More reliability with low capital expenditure

**Sappi eliminates risks at the winder with the modular control system rebuild. The plant in Lanaken is now protected against unplanned downtimes. The planning of the project according to the Perfect Fit concept accurately uses investments and seamlessly integrates existing, functionally stable components. Possible later use of further rebuild packages makes the control system rebuild future-proof.**



*Fig. 1: The old DOS computers (left) are replaced by new Windows-based PCs with current technology (right).*

Winders have worked reliably and safely over many decades. But control system technology has advanced significantly over the last few years. Previously, standardized controllers in Z80 technology were used to carry out technical functions such as positioning tasks or linear load controls. Today, a standard Siemens S7 PLC can do these tasks (Fig 1).

The age of control systems from the '70s and '80s makes them a downtime risk. In addition, their large number of components often lead

to failure of individual assemblies. Exacerbating this is a lack of supply of replacement parts, which often can no longer be obtained. For this reason alone, longer downtimes have to be expected.

**Modular concept – Perfect Fit**

Modular control system rebuilds for winders are part of a series of Perfect Fit solutions from Voith. It is an excellent example of how customized solutions can achieve set goals with a reasonable investment budget. The controller,

control desk and technology components that belong to the control system can be adapted to today's requirements, independently of one another and in any order. Due to the fact that the rebuild or replacement is limited to at-risk components, the risk of downtimes is drastically reduced, on the one hand, and the investment budget is spared, on the other. Elements that are not so prone to error and have a good supply of replacement parts remain fully integrated. They can be modernized at a later time with a further rebuild package.



*Fig. 2: VariTop winder at Sappi in Lanaken, Germany.*

	Control	Interface	Technology
Before	S5	Control desk	Teleset, Telebock LDS, ZHZ Jagmatic DOS
After	S5	Control desk	S7 VariTronic WinCC
Modernization options	S7 VariTronic WinCC		

**Location**

**Belgium**



The township of Lanaken is in the east of Belgium. Close to the Dutch border, Lanaken has approximately 25,000 residents.

**Contact**



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Fig. 3: Comparison: before - after, including further possible modernization options.

**Field report**

Sappi Fine Paper produces coated graphic paper with a capacity of 500,000 tons/year at the Lanaken location. After some age-related difficulties with the control system of the VariTop (Fig 2), the company decided in favor of a technology upgrade on the winder. The requirement for an open system that is easy to maintain had to be met.

The existing computer systems were replaced by a Simatic S7. When replacing the old computer cabinets,

the entire wiring was retained and costs and time were saved.

Separately, the stop counter was eliminated and the angle encoders were replaced by new types or by a magnetostrictive sensor for the slitter positions. The system can be comfortably operated via an industrial PC with a WinCC user interface. Maintenance and replacement parts procurement is thus assured. Smaller repairs can be carried out with little training expense by a company's own operating personnel. If at a later time the PLC is also to be

modernized, then the machine functions can be smoothly integrated in the S7 that is now installed (Fig 3). Operation is then done exclusively via the operator station.



*“Voith only suggested to us what we really needed in this situation, nothing more.”*

*Alfons Loyens, SHEQ Engineer Finishing PL8, Sappi Limburg – Lanaken plant*

*“It was important to us that we didn't have to replace functioning elements of the control system. The integration of old and new was no problem. We were thus able to use our investment funds in a targeted fashion and despite that eliminate the problems and risks of the old control system. Voith only suggested to us what we really needed in this situation, nothing more. And that was convincing.”*



**News from  
the Voith Paper  
product world**

Optimization goals at a glance

# Smart products – great effects

It doesn't always have to be the construction of a new paper machine or the major retrofitting of an existing system – even small solutions can achieve a big effect. Voith Paper offers over 200 clever optimization products and services with major customer benefits. That's over 200 ways to improve the production process with low investment costs and a high return on investment. We present a selection of them in each issue of *twogether*.

So that you can see at a glance the goals that can be achieved with each product, we have introduced symbols that can now be found at the end of the product and service articles.

By assigning up to four points per goal, the benefit of a product can be quickly illustrated.

- 1 means "minimal" influence,
- 2 = significant,
- 3 = above average and
- 4 = used primarily for this reason.

In the text it looks like this:

On Focus	
ProSafety	+ □ □ □ □
ProEnvironment	+ + □ □ □
ProRunnability	+ + + + □
ProQuality	+ + + + □
ProSpeed	+ + + □ □
ProSpace	+ + + + □

The optimization goals of ProSafety, ProEnvironment, ProRunnability, ProQuality, ProSpeed and ProSpace are differentiated.

What lies behind these various labels is explained in more detail below:

### ProSafety – improves work safety and thus health protection

- Protection from injuries (intervention protection, maintenance of safety-relevant parts)
- Reduction of noise and emissions

### ProEnvironment – conserves resources and thus the environment

- Lowers water consumption
- Reduces energy consumption
- Reduces use of chemicals (retention agents, cleaning)
- Uses raw materials better (increases raw material efficiency)
- Reduces oil leakages

### ProRunnability – increases the running time efficiency of the PM

- Reduces downtimes (for cleaning, upkeep, clothing change)
- Reduces downtimes, increases security against unscheduled stoppages
- Reduces breaks
- Quicker threading after breaks, change or transfer at production speed/higher speed, e.g., through flying splice
- Reduces time for grade change

### ProQuality – increases surface efficiency and achieves a higher level of quality

- Improves surface longitudinal and cross profiles
- Improves formation
- Reduces two-sidedness
- Increases specific volume
- Improves printability
- Improves paper characteristics
- Reduces the amount of broke, reduces changeover broke (quicker grade change)
- Increases usable paper web width

### ProSpeed – increases the production capacity

- Increase in production speed due to:
  - higher dry content after press
  - higher drying performance in the dryer section
  - drives that allow higher speed

### ProSpace – with limited space conditions

- Retrofits that also function with limited space conditions or allow a production/quality increase without extension of the machine
- Products that require less space than comparable products from competitors



*Experts are always seeking out new application areas for the Single NipcoFlex press.*

Proven concept – not just for copy paper

## Single NipcoFlex – breaking out to new paper grades

**It is now more than six years since the first Single NipcoFlex press was put into operation. It quickly developed into a bestseller. Then, as now, the low investment and energy costs were especially appealing. Today seven Single NipcoFlex presses are being used to produce wood-free copy, writing, and printer paper. In the future the presses will also be able to be considered as alternatives for coated and wood-containing paper.**

These days budgets for new machines and rebuilds are being cut massively, leading to the obvious desire for a low-cost but high-performance press section, which should then also be characterized by low operating and especially low energy costs. The requirements list sounds like an unattainable

dream. However, installation of a Single NipcoFlex press can make this dream come true.

Apart from investment and energy savings, maintenance and clothing savings are also possible. The cost advantages of the single press are summarized in Fig. 2.

### **A valuable treasure trove of experience**

There are currently seven Single NipcoFlex presses in operation. In August 2006, PM 1 in Docelles, France, was converted to a Single NipcoFlex. This represented a technological challenge. For one thing,

very demanding qualities, in part with high smoothness values, are made on this paper machine. For another thing, a multitude of grades are produced, meaning that speed, furnish, and additives as well as basis weight must be changed frequently. The latter, especially, was classified as critical in advance because a real test of the process stability with frequent grade changes cannot be realized on the pilot paper machine.

Through the combination of the single press with two Softnip calenders, the quality specifications could be achieved. The machine speed and stability improved step-by-step, with the use of Voith press felts especially contributing to the progress. The moisture profile was significantly improved. This, in turn, enabled the moisture after the predrying section to be increased. The drying capacity thereby gained was then immediately converted to an additional increase in speed.

Khon Kaen PM 1	
Basis weight	70 g/m <sup>2</sup>
Filler content	14%
Bulk	1.30 cm <sup>3</sup> /g
Bendtsen roughness (mean)	110 ml/min
Bendtsen roughness (two-sidedness)	5%

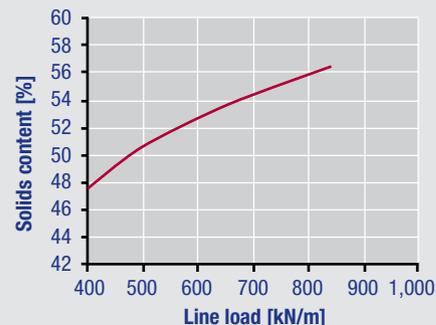


Fig. 1: Khon Kaen PM 1: The paper exhibits a high bulk with a high smoothness and a low two-sidedness at solids contents after the press of much higher than 50%.

With the experience from the single presses that was now available, start-up of the next two new machines with Single NipcoFlex presses was nearly child's play.

In April 2008, PM 1 in Khon Kaen, Thailand, was put into operation, and in February 2009 the PM 1 in Tres Lagoas, Brazil, was started up. The stable, high solids contents of both machines made it possible to increase the speed significantly in the shortest amount of time. Thanks to

the outstanding furnish, a very good bulk and a high smoothness can be achieved in Khon Kaen with the Single NipcoFlex press at extremely high solids contents. Even with the load on the press eased considerably, press solids above 50% are achieved on this machine (see Fig. 1). Good news can also be reported from the six-year-old single press being used on PM 18 in Ruzomberok, Slovakia. It is continuously improving its production speed.

		Single NipcoFlex	Tandem NipcoFlex	DuoCentri NipcoFlex + 4th
Energy	Vacuum requirements [Nm <sup>3</sup> /h]	100%	135%	155%
	Installed drive power [kWh]	100%	190%	165%
Maintenance	Downtime	100%	130%	135%
	Press sleeves	100%	200%	100%
	Clothing costs	100%	130%	100%
	Investment costs	100%	155%	165%

Fig. 2: The cost advantages speak for themselves: Comparison of investment and operating costs for various press designs for manufacturing copy paper with no two-sidedness.

PM	Main Products	Wire Width	Max. Production Speed (Design)	Start-Up
Ruzomberok PM 18	Copy	7,300 mm	1,400 m/min	Sept. 2003
Ledesma PM 1	Copy (wf: 60–140 g/m <sup>2</sup> )	4,220 mm	1,000 m/min	May 2004
Merebank PM 31	Copy (wf: 60–100 g/m <sup>2</sup> )	6,370 mm	1,300 m/min	Sept. 2005
n.n. USA	wf: 75–90 g/m <sup>2</sup>	9,500 mm	1,200 m/min	Nov. 2005
Docelles PM1	Copy (wf: 60–160 g/m <sup>2</sup> )	4,350 mm	1,200 m/min	July 2006
Khon Kaen PM 1	Copy (wf: 60–120 g/m <sup>2</sup> )	5,850 mm	1,300 m/min	April 2008
Tres Lagoas PM 1	Copy	5,850 mm	1,250 m/min	Feb. 2009

wf=woodfree

Fig. 3: Reference list for currently installed Single NipcoFlex presses.

By now copy paper has already been produced at over 1,600 m/min. This is an impressive achievement for this paper grade and simultaneously a world record for single-nip presses. PM 18 was originally designed for a maximum speed of 1,400 m/min.

In contrast, PM 1 in Ledesma, Argentina, is the first machine with a Single NipcoFlex that is being used in part to produce high-quality coated grades. This demonstrates the potential of this design.

**Further development as a key to success**

Development of a press design is never over, even after the machine has been started up. Each installation brings with it new challenges. Hence, it is important that the machine operator and the supplier are always in a dialog – even long after the start-up phase. The Voith single presses are now distributed over numerous loca-

tions around the world. Two references are in Europe, three in America, one in Africa, and one in Asia. A strong exchange of information is maintained with all customers. The corresponding service employees and technologists are always available. Through the local presence of the service employees, strong on-site support is ensured. This allows the best design regarding machine construction and clothing to be provided to every Single NipcoFlex operator.

**Single NipcoFlex – what’s next?**

Due to the success of copy and wood-free uncoated paper, the question naturally arose as to whether or not a Single NipcoFlex could also be used for projects with other paper grades. Within the framework of an extensive development project, Voith investigated the possibilities and limitations of the Single NipcoFlex for other paper grades.

The challenges are manifold. Production of wood-free coated paper arises as the next application case. Purely in terms of the dewatering behavior and the expected pollutant load, the furnish qualities used are very similar to those used for copy paper. In extensive process trials with subsequent print tests, the quality differences in comparison with conventional press designs were investigated. The quality of the paper from the Single NipcoFlex was definitely convincing. Fears that the surface quality in particular could suffer from the hefty pressing in a single press nip were clearly crushed.

As expected, papers from various press systems differ in terms of parameters such as bulk, porosity, and internal bond strength. For this reason, for every single customer project, the advantages and disadvantages of the various design alternatives must be weighed. The single press can now also be viewed



Fig. 4: In March 2009, PM 18 achieved a world speed record for single presses by running at 1,600 m/min.

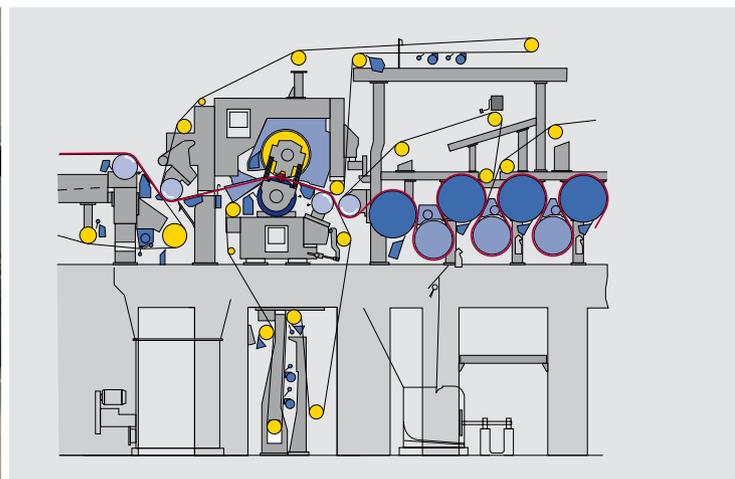


Fig. 5: Simple concept, sophisticated details: Design of the Voith Single NipcoFlex.

as an alternative to the tandem press in particular, especially if the overall machine design provides a precalender and a starch application.

Greater obstacles must be overcome in the use of the Single NipcoFlex with wood-containing grades. Considerably higher peak pressures in the press nip are necessary in order to achieve the required solids content for fast machines. Besides this, the furnish used contaminates the felts more than it does with woodfree paper. This occurs, for example, with recycled paper-containing furnish with high stickies content. Particular attention must hence be paid to the combination of clothing used and suitable machine construction during development. Voith is ideally equipped for these development types in particular. Clothing and mechanical engineering experts work hand-in-hand so that this goal can be promptly achieved.

**Trials with surprising results**

How high can the press solids actually be for wood-containing furnish with the use of the correspondingly adapted clothing? The answer even surprised the Voith experts.

With just a single press, newspaper could be produced on a trial scale at a speed of 2,000 m/min, with a solids content after the press being much higher than 50%. The basic requirement that a press design must fulfill for high-speed machines was, therefore, met.

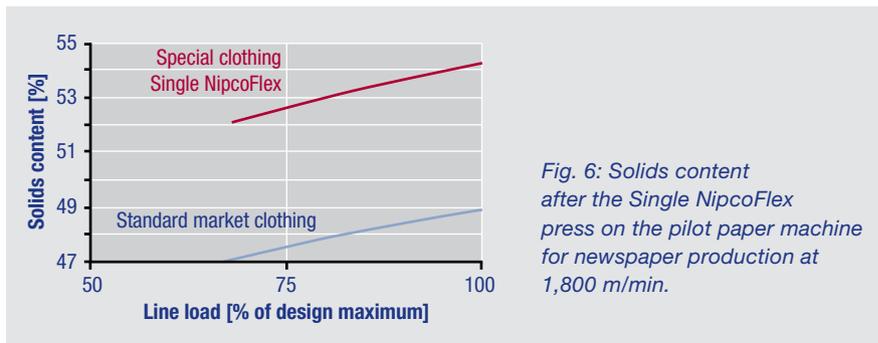


Fig. 6: Solids content after the Single NipcoFlex press on the pilot paper machine for newspaper production at 1,800 m/min.

How, though, are these high solids contents possible after a single shoe press nip?

Even in classic press systems (considerably lower), and even in the two shoe press nips of the tandem press together (barely higher), dewatering performance is achieved. Two factors are decisive for this.

The Single NipcoFlex uses a shoe length that achieves a considerably higher dwell time in the press nip than in the sum of three or four roll nips in series. In addition, the fiber web is dewatered on both sides along the entire press length. The two felts in the Single NipcoFlex have a difficult task to accomplish. They have to handle the total water and pollutant load in the press section. In doing so, they must work stably to ensure that process fluctuations have practically no effect on the dryness after the press.

The compensating effect of several press nips in series does not exist in the single press. Hence, it will still take some time before the Single NipcoFlex press also becomes a

standard design for wood-containing stocks and extremely high speeds.

Despite this, in the future the Single NipcoFlex press design will increasingly come into consideration as an alternative for projects in the wood-containing area. It is simply unbeatable in terms of investment and operating costs.

**On Focus: Single NipcoFlex Press**

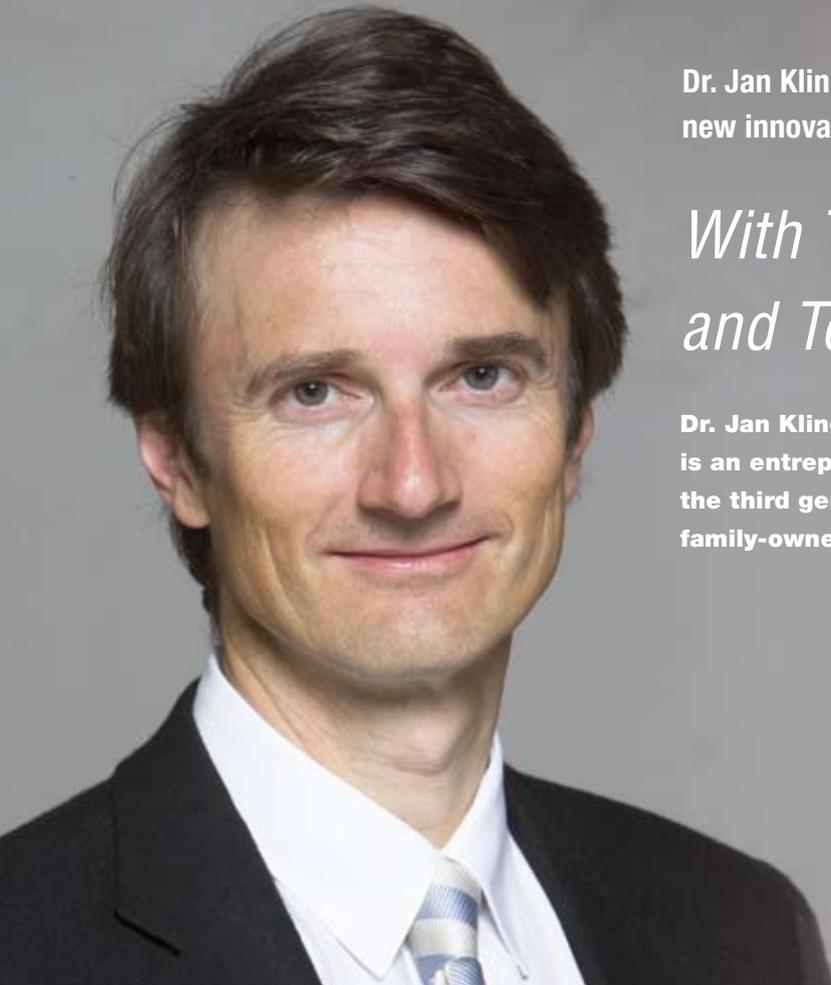
ProEnvironment	++++
ProRunnability	+++
ProQuality	++
ProSpeed	+++
ProSpace	++++

Section: press  
 Width: all  
 Paper grade: woodfree coated and uncoated

**Contact**



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Dr. Jan Klingele trusts in new innovations, true to the motto:

## *With Tempo, Technique and Teamwork*

**Dr. Jan Klingele, Managing Director of the Klingele Group, is an entrepreneur with an enthusiasm for innovations. He is the third generation of his family to manage the German, family-owned enterprise founded in Weener in 1920.**

*Dr. Jan Klingele, Managing Director of the Klingele group.*

**twogether:** Dr. Klingele, your company has been the very first to invest in the new Voith Paper BoostDryer technology. Why has Klingele dared to be the first?

**Klingele:** We trusted in the BoostDryer, because we were highly interested in improving the technological values by a densification of the web. Apart from that, the reduced space requirements were attractive for increasing the drying capacity of our pre-dryer section.

**twogether:** How long did it take you to decide that you wanted to take this step?

**Klingele:** About half an hour – that is how long the presentation took at the

Voith Paper “Ahead” Customer Conference in May 2004, when I heard about the BoostDryer concept for the first time. After the presentation, I told the Voith staff to contact me if they needed a partner for BoostDryer trial operation.

**twogether:** How much courage does it take to make such a decision?

**Klingele:** Even though we had, and still have, great trust in the reliability and performance of our Voith partners in the BoostDryer project, it still takes a considerable amount of courage to go first. After all, it’s in the nature of things that not all trials for fundamental innovations can be successful.

You see, it’s not only about thorough research and careful realization – you also always need a share of luck to choose the right future technology.

**twogether:** Trusting in new technologies may also be risky. What was your major concern beforehand?

*BoostDryer enhances the technological values of the paper.*



**Klingele:** That our paper production could be heavily affected by installing the BoostDryer prototype – after all, we have only one paper machine. That’s why it was extremely important to us that we can bypass the Boost-Dryer in case any problems occur.

**twogether:** What have been your expectations of the BoostDryer? And so far, how have they been fulfilled after the first phase of operation?

**Klingele:** We expected an increase of our drying capacity in combination with significantly improved technological properties of our paper. And of course a reliable, efficient machine that is easy to operate in practice.

**twogether:** What is most important in a pilot project in your opinion?

**Klingele:** Reliable and committed partners with know-how, patience and persistence.

**twogether:** The BoostDryer has been running now for more than a year, and global economy is currently suffering as never before. How do you evaluate your decision from the present point of view?

**Klingele:** In times of crisis, competition grows fiercer, and it’s getting more and more important to produce better paper less expensively than fellow competitors. That’s where the BoostDryer boasts advantages over a conventional extension of the dryer section: It offers the possibility to improve the technological values of the paper and/or reduce starch and energy consumption.

**twogether:** Your enterprise comprises both paper and packaging production facilities. How important is it nowadays to combine both branches under one roof?

**Klingele:** We are happy to combine both value-added activities, as it helps to somewhat mitigate the heavy price fluctuations on the paper market. Nevertheless, both market levels must be competitive on their own. Some companies find it easier to achieve high efficiency if they focus on one level. This may be an equally successful strategy than vertical integration.

**twogether:** What makes Klingele special, compared to other family-owned enterprises working in the same business?

**Klingele:** Generally, I’d say that on average, the other family-owned companies in our industry are more similar to ours than the groups working in the same business. Maybe you could say that at Klingele, we are more consistently trying to benefit from the advantages of a family-owned company managed by the owner. This includes, in particular, speed of

reaction and flexibility, our readiness to invest in new technologies and our aspiration for long-term partnerships in line with our slogan “With Tempo, Technology and Teamwork.”

**twogether:** Where do you see your company in the future? Where is the paper and packaging industry heading?

**Klingele:** I’m optimistic as far as the future of the Klingele group is concerned: We have satisfied and loyal customers, dedicated and qualified personnel, as well as advanced and efficient technological equipment. This way, we should be prepared for the severe competition that I’m expecting for the paper and packaging industry in the years to follow.

**twogether:** What is your next goal?

**Klingele:** Our goal has been, and will be, to remain successful by offering our customers a good value.

**On Fous: BoostDryer**

ProEnvironment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ProRunnability	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ProQuality	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ProSpeed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ProSpace	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Section: drying  
 Width: max. 7,500 mm  
 Paper grade: packaging papers

**Contact**



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The kick for every size press

## SizeWings AT boost young and old paper machines

**You don't have to be big to be great. Even small equipment can give the essential kick to increase production or quality. SizeWings AT (Advanced Technology) are one of these small, but clever products for the paper machine.**

Increasing production speeds, while improving paper quality, pose new challenges to all machine components. In existing size presses, higher speeds cause increased splashing in the sump. Heavily soiled size presses, however, are extremely detrimental to paper production. This is where SizeWings AT should be used.

SizeWings AT are a clever equipment allowing non-splashing starch supply to the roll nip, thus ensuring a uniform sump level across the entire web width.

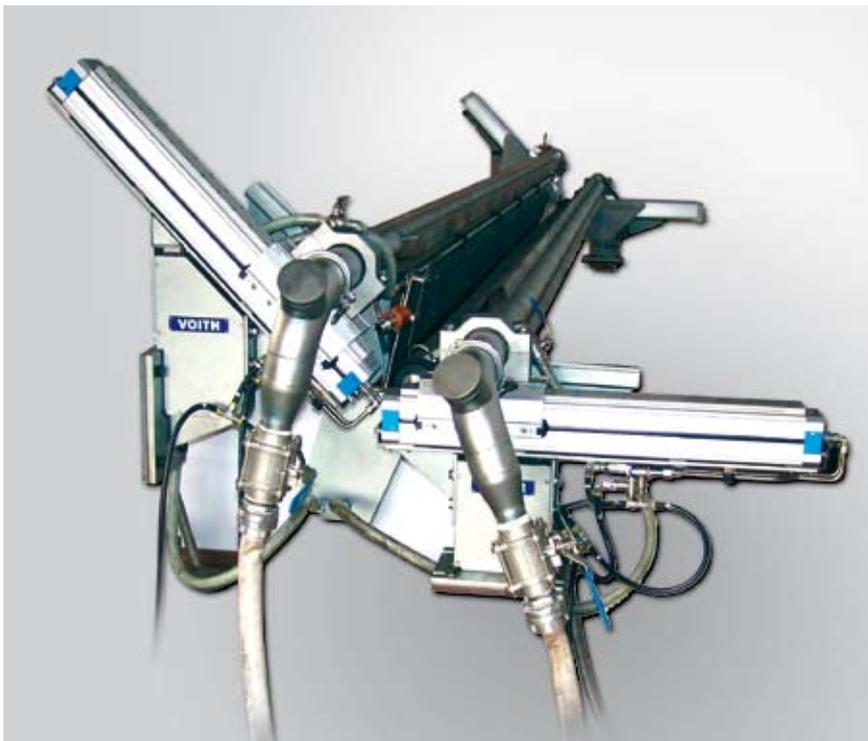
The SizeWings AT installed up to now confirm their effectiveness. Every time, significant improvements could be achieved. Starch application behavior and size press cleanliness improved considerably in all cases.

Thanks to the improved sump behavior in the size press, higher production speeds are possible. Production increase, combined with low investment costs, results in a short amortization time – the cost-benefit ratio could hardly be better.

### Fantastic experiences from Switzerland

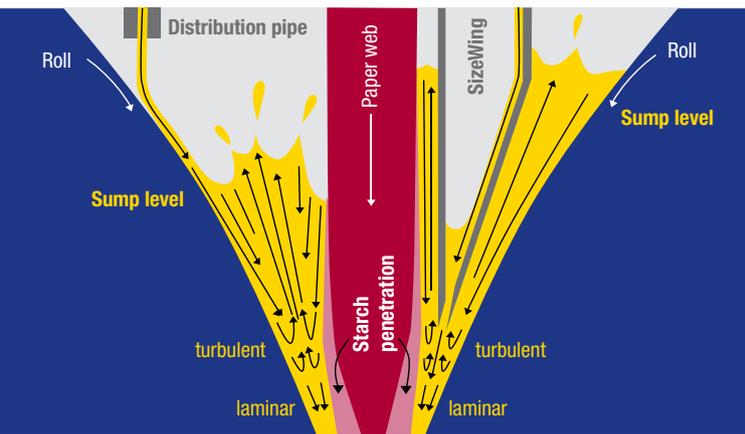
In Weinfelden, Switzerland, Thurpapier Model AG operates two paper machines, PM 1 and PM 2. The machines are almost identical in design:

They produce testliner and corrugating medium in a basis weight range of 100-220 g/m<sup>2</sup> on a wire width of 2,500 mm and are equipped with conventional size presses. PM 2 produces testliner in a basis weight range of 110-200 g/m<sup>2</sup>. Starch is

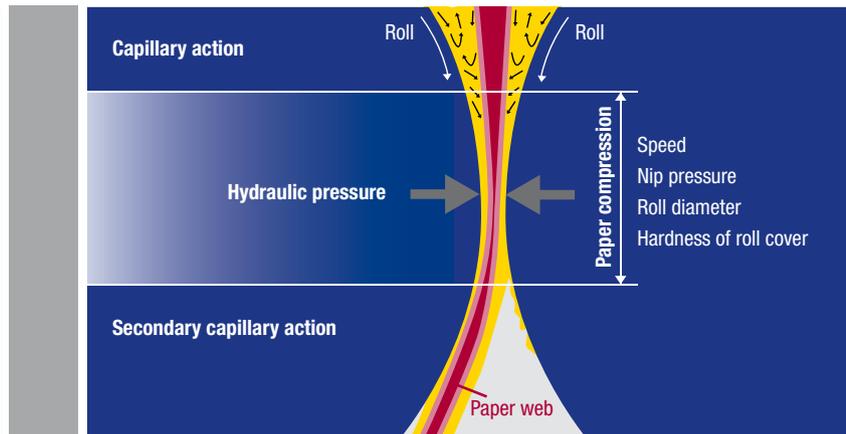


*Left:  
SizeWings AT with moving device for flexible operation of the size press (one-sided or double-sided).*

*Right:  
Without SizeWings, the sump was rather unsteady.*



Starch penetration is influenced by many factors, such as speed and roll diameter.



SizeWings stabilize the sump behavior.

mainly applied to one side. After PM 2 had faced increasing problems with uneven CD strength profiles, Voith Paper was commissioned to eliminate the quality problems. In addition, clean size press operation was to be ensured, thus improving runnability.

**SizeWings AT ensure uniform paper quality**

Using SizeWings AT in PM 2 resulted in a 50 m/min speed increase to 780 m/min. At the same time, the strength values of the end product remained unchanged or were even increased at lower basis weights. The

plied from the same starch kitchen. Cleanliness in the size press increased considerably since SizeWings AT have been used. Now, it takes about five shifts for the size press to be soiled as much as before after only one shift. The number of web breaks at the size press has also been significantly reduced.



*“The component meets all papermaker’s demands.”*

Ernst Herzog, Technical Manager at Thurpapier Model AG, Weinfelden/Switzerland

increased sump level in the size press produces a longer penetration time, thus improving starch efficiency. A direct comparison of PM 1 and PM 2 showed another advantage. The size press of PM 2, which had been equipped with SizeWings AT, hardly reacts to fluctuations of the starch quality. Whatever the starch quality, the end product is always excellent.

This is easy to prove, since the size presses of both machines are sup-

Mill Manager Andreas Klumpp and Technical Manager Ernst Herzog have been observing the SizeWings since the start-up in August 2008 and are delighted. The equipment has been functioning since without any problems worth mentioning. “The component meets all papermaker’s demands. Since its start-up, it has not required any special attention. This is a great advantage,” says Ernst Herzog.

Andreas Klumpp summarizes the Swiss experiences:

Project/Customer	Country	Start-up	Paper grade	Basis weight [g/m <sup>2</sup> ]	Paper web [mm]	Working speed [m/min]
<b>Weinfelden PM 2</b> Thurpapier Model AG	CH	2008	Testliner	140 – 280	2,500	650
<b>Nine Dragons PM 17</b> Nine Dragons Paper Industries (Taicang) Co., LTD	CN	2008	CM	80 – 145	6,860	1,000
<b>Zhejiang LCPC PM 6</b> Zhejiang Long Chen Paper Co., LTD	CN	2009	CM	90 – 110	6,660	825
<b>Wuxi LCPC PM 3A</b> Wuxi Long Chen Paper Co., LTD	CN	2009	CM	90 – 110	6,660	825
<b>Zhejiang LCPC PM 5</b> Zhejiang Long Chen Paper Co., LTD	CN	2008	Testliner	125 – 250	6,660	825
<b>Frastanz PM 2</b> Rondo Ganahl AG	AT	2007	Testliner CM	105 – 200	2,600	900
<b>Mannheim PM 6</b> SCA Mannheim	DE	2004	Grease-proof	29 – 60	3,150	530
<b>Pitten PM 3</b> Papiererzeugung W. Hamburger AG	AT	2000	Fluting	100 – 200	2,500	1,050

*SizeWings AT are suited for any paper grade.*

“I wouldn’t want to do without SizeWings AT any more!” On the contrary: The next step is to equip PM 1 with SizeWings AT as well, thus increasing starch concentration.

### Three upgrades for Long Chen

The Chinese papermaker Long Chen Paper chose another way. The company immediately ordered SizeWings AT for the three new paper machines: Wuxi PM 3A, Zhejiang PM 5 and Zhejiang PM 6.

All three of them are large machines with a wire width of 7,250 mm and a design speed of 1,000 m/min. Voith Paper delivered the complete stock preparation and approach flow systems for each line.

The three-ply PM 5 in Zhejiang was put into operation shortly before Christmas 2008. It produces testliner in a basis weight range

of 125-250 g/m<sup>2</sup>. The maximum operating speed is 825 m/min, and production is laid out for 400,000 t/year.

Wuxi PM 3A and Zhejiang PM 6 are identical machines with regard to the stock preparation system and machine equipment. They achieve an annual output of 250,000 tons of corrugating medium in a basis weight range of 90-110 g/m<sup>2</sup> with a maximum speed of 825 m/min. Wuxi PM 3A was put into operation early in 2009 and Zhejiang PM 6 by the end of April.

*“I wouldn’t want to do without SizeWings AT any more!”*

Alexander Klumpp, Mill Manager at Thurpapier Model AG, Weinfelden/Switzerland

### On Focus: SizeWings

- ProEnvironment +
- ProRunnability + + +
- ProQuality + +
- ProSpeed +

Section: sizing  
Width: max. 7,500 mm  
Paper grade: all

#### Contact



**Martina Eibelhuber**  
martina.eibelhuber@voith.com



Fig. 1: With the PLURALIS family of fillings, the specific edge load is reduced considerably.

Save energy with new refiners and refiner fillings

## Changeover to PLURALIS pays for itself

**Cost reduction is a top priority in the paper industry. Three examples show how optimizing refiner fillings can improve energy balance and stock quality – and hence operating costs. The savings can be substantial: In one case, the mill lowered its annual costs by 193,000 euros (approximately US \$257,000).**

Fiber refining is assuming an important role in paper manufacturing: It is a key technology in stock preparation, with far-reaching effects on

the properties of the paper produced. The high-energy input that refining requires, however, has a negative effect on operating costs.

Optimization and development of refining machines, and state-of-the-art components, have a long tradition at Voith Paper.

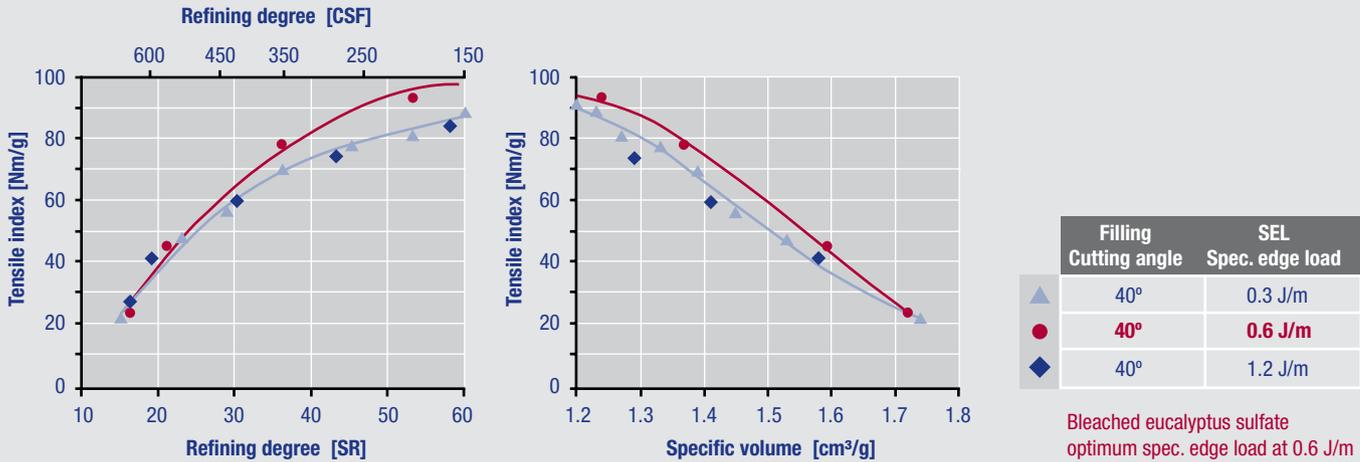


Fig. 2: There is an optimum specific edge load (SEL) for each fiber.

To ensure optimum, energy-saving operation, Voith Paper has developed a wide range of refiner fillings. Our new PLURALIS fillings represent the latest addition to that range.

Each fiber has an optimum specific edge load (SEL) for its refining treatment. For example, the optimum value for eucalyptus is 0.6 J/m (Fig. 2). Loads above or below the optimum SEL deliver lesser strength values. Hence, the SEL should be set at a level appropriate to the design of the refining unit. The refiner filling serves as an actuating element here. In practice, the SEL is often too high for the fiber used. Lowering the specific

edge load requires refiner fillings that exhibit high cutting-edge lengths because the effective refining power of the refiner usually must remain constant (see Fig. 3). To meet these requirements, Voith Paper developed the PLURALIS family of fillings, tested them with customers, and placed them on the market. These cast fillings make it possible to lower the specific edge load to a very economical level.

### Reduction in edge load

The Varel paper and cardboard mill, for example, used PLURALIS refiner fillings to replace standard refining fillings. In the production of high-quality cardboard grades, PLURALIS resulted in a considerable improvement in formation and a decisive improvement in quality. A reduction in specific edge load enabled high-quality fibers to be refined more intensively, resulting in improved formation of the outer layers and in lower costs. For high-quality recycled paper grades, the new refining unit fillings enabled significant lowering of the basis weight of the outer layers without compromising their

technological properties. Introducing PLURALIS also saved energy by eliminating the need to run two refiners in series in order to achieve refining level specifications. The introduction of PLURALIS has also prevented overloading damage to refiner fillings, sharply reducing downtimes for the fillings. The Varel papermaker, satisfied with these results, plans to use this technology in other refining.

### 10 to 25 percent less energy

At the M-real Zanders paper mill in Bergisch Gladbach, obsolete steep-angle refiners were replaced. They had proven to be uneconomical, very high maintenance, and lacking adequate capacity for a planned production increase. Instead, Voith Paper installed a new short-fiber refining unit with four TwinFlo TF1E double disk refiners. The PLURALIS refiner fillings represented the technological heart of the improvements. Through them, the specific edge load was lowered as much as necessary for the eucalyptus fiber predominantly in use. The preliminary pilot plant trials performed in

$$SEL = \frac{P_{eff}}{CEL} \text{ [J/m]}$$

$P_{eff}$  = Effective power of refining machine [kW]

CEL = Cutting edge length of refining unit filling [km/s]

Fig. 3: Formula for calculation of SEL.

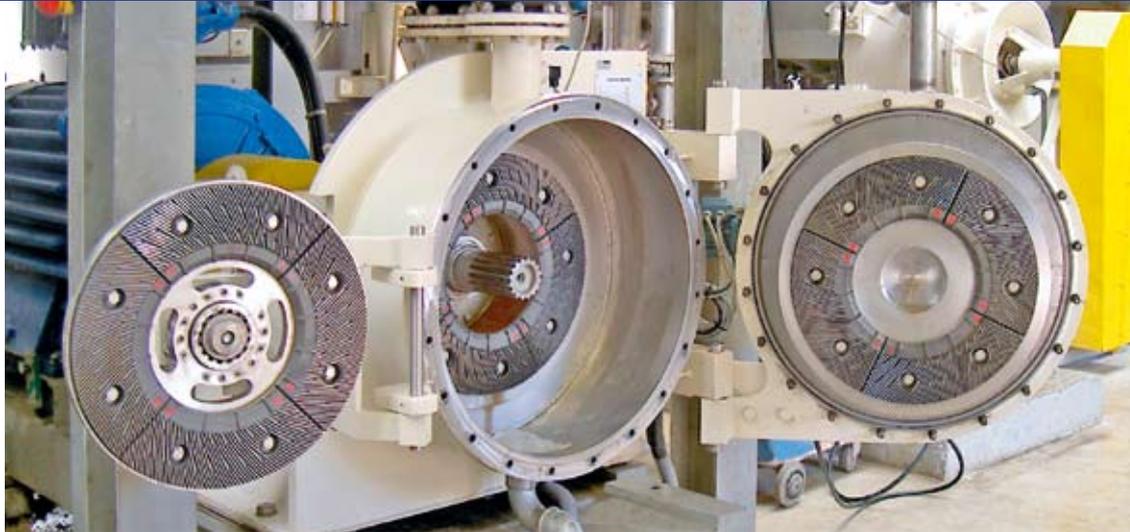


Fig. 4: At M-real Zanders in Bergisch Gladbach, this TwinFlo double disk refiner, in combination with a PLURALIS refiner filling, forms the ideal solution for eucalyptus fiber.

Ravensburg in advance of the investment were confirmed in practice. “Through the rebuild, we have achieved energy savings of 10% to 25%,” reports Oliver Kalmes, Production, Papermaking, and Finishing of Cast-Coated Paper Manager at M-real Zanders. The rebuild enabled manufacture of denser paper without sacrificing its technological properties; with some grades, long-fiber content was lowered without losing the paper’s good strength properties.

their capacity transferred to an existing refining line with two Beloit double disk refiners. On its own initiative, the customer converted the double disk refiners from MonoFlo to DuoFlo to increase hydraulic capacity. Additionally, the mill needed to transfer the total refining energy that two double disk refiners required — without greatly increasing the SEL for the fiber mix. Voith Paper achieved this goal by equipping the Beloit DD3000 refiner with PLURALIS

they enable optimal high capacity operation with existing refiners. Now StoraEnso in Uetersen has converted another refining line to PLURALIS.

These three projects show that appropriately chosen PLURALIS fillings can help to lower operating costs significantly. The result is more economical product manufacturing and improved product quality. In all three projects, the basis for success was the good partnership with the customer.

*“Through the rebuild, we have achieved energy savings of 10% to 25%.”*

Oliver Kalmes, M-real Zanders

Because of these modern double disk refiners, the mill’s maintenance and filling costs are lower today.

**Annual savings:  
193,000 euros (US \$257,000)**

At StoraEnso in Uetersen, an old refining line with five shallow angle refiners was to be eliminated and

refiner fillings, which can supply the required cutting edge length.

The result was convincing: According to the papermaker, the sum of all these measures led to annual savings of 193,000 euros (approximately US \$257,000). Investment costs were comparatively low. PLURALIS refiner fillings cut costs decisively because

**On Focus: PLURALIS**

ProEnvironment	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ProRunnability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ProQuality	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section: stock preparation

Width: all

Paper grade: all

**Contact**



**Achim Schröder**  
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*OnQ ModulePro water-air moisturizer –  
the all-rounder for existing systems*

*OnQ ModulePro compact is the ideal re-moisturizer for systems with a maximum speed of 1,500 m/min.*

Water-air moisturizers for every case

## OnQ ModulePro – the measure of all things

**A high investment budget is not always needed in order to obtain outstanding optimization results. An improved moisture profile, increases in speed or energy savings can already be obtained with installation of re-moisturizers in the dryer section.**

A distinction is made between moisturizers with single-substance and dual-substance nozzles. Moisturizers with single-substance nozzles are simply water moisturizers with which the water is hydraulically atomized and applied. So-called “water-air moisturizers” with dual-substance nozzles, in which the spray water is fed into the nozzle air and pneumati-

cally atomized, attain a noticeably better atomizing effect.

### **All-rounders for existing systems**

For years, OnQ ModulePro nozzle moisturizers have been providing for high quality and increased cost-efficiency with modern systems. Optimal moisturizing results presup-

pose outstanding spray quality and exact spray quantity monitoring. The OnQ ModulePro product line meets these high requirements with its innovative dual-substance nozzle and valve technology. Along with OnQ ModulePro for systems that have the highest quality requirements (thermo paper, SC paper before the calender), with OnQ ModulePro

compact there is now a solution for paper machines with somewhat lower requirements. However, there are no trade-offs in the result.

OnQ ModulePro compact was newly designed with two rows of nozzles and a 50 or 75 mm zone width especially for older, existing systems with a maximum speed of 1,500 m/min and a paper web width of up to 8,500 mm. Moisture problems often appear with these machines, although they are already equipped with a water moisturizer or profiler. However, for some applications the simple water moisturizers are technologically at their limit.

This shows in the paper quality:

- Poor moisture profile before the reel, the calender or the coater
- Generally unsatisfactory moisture level (overdrying)
- Curling problem (curling tendency)

Due to these quality defects, in the printing plants there are problems with runnability of rolls and therefore complaints because of web tension.

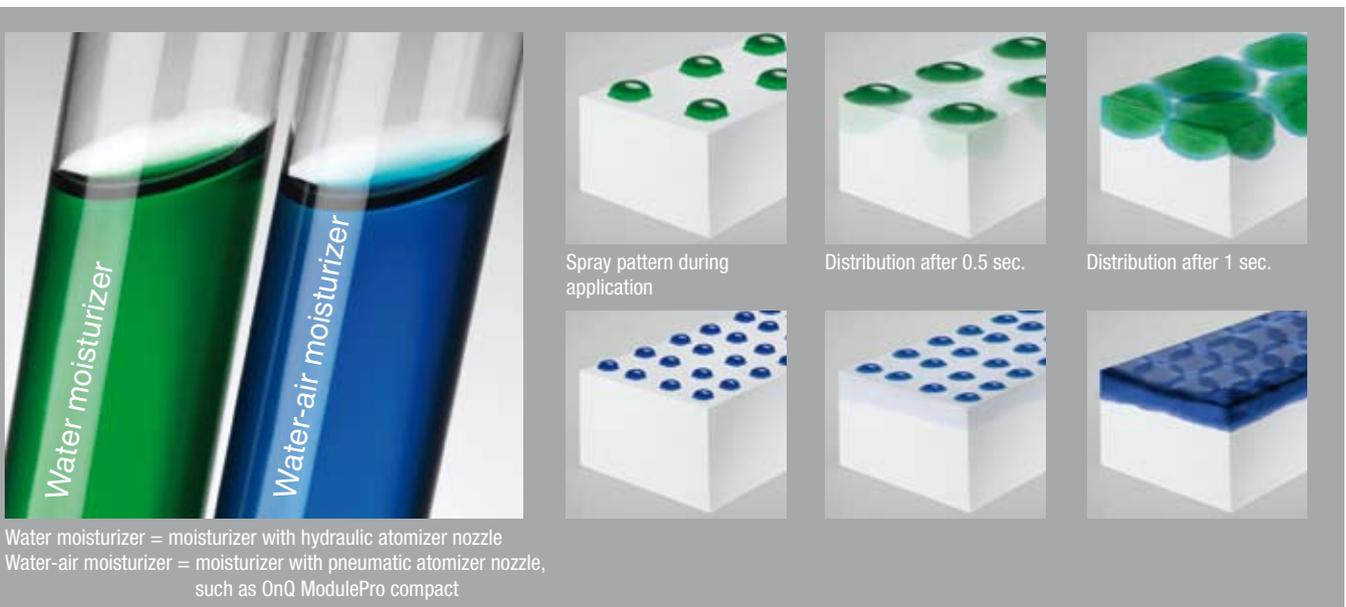
**Thanks to “Perfect Fit” the cost-benefit ratio is right**

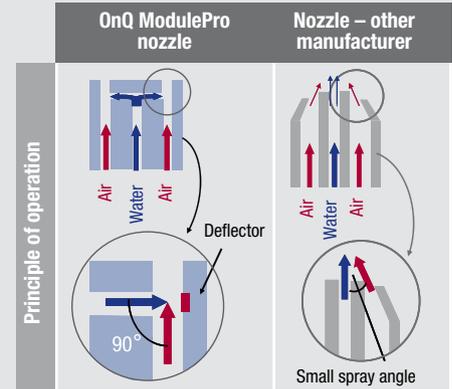
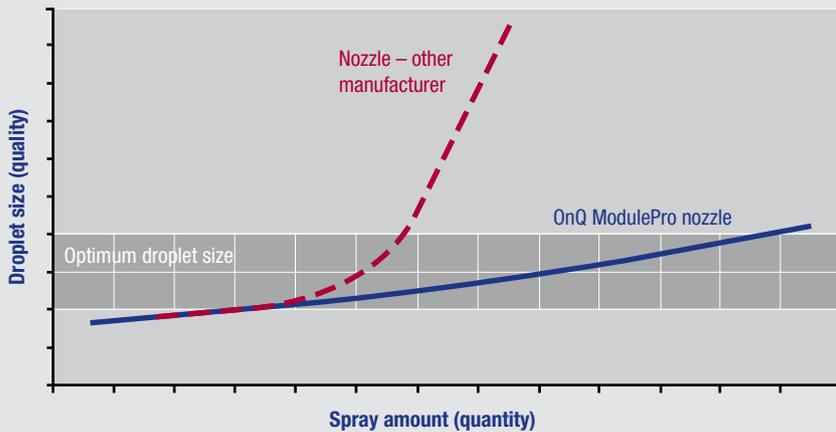
With the OnQ ModulePro compact, Voith Paper has created a “Perfect Fit” solution as an alternative to the simple water moisturizers. Usually, the investment costs for a water-air moisturizer are higher than for a water moisturizer with a single-substance nozzle. But OnQ ModulePro compact pays off thanks to its innovative nozzle and valve technology, in contrast to simple water moisturizers. With the latter, large droplets come about when atomizing that take substantially longer to penetrate the paper. Thus, these simple water moisturizers are limited in use roughly up to the middle part of the dryer group.

Whereas a water-air moisturizer also shows its full effect at the last dryer cylinders where the paper still has a residual moisture of 7-9%. Due to the especially fine atomization of the water application, it is possible to install OnQ ModulePro compact at this position in the paper machine because the homogeneous spray pattern with the smallest droplets allows an altogether smaller quantity of water to be applied at the end of the dryer group. Thus, in contrast to simple water moisturizers, less drying in the dryer section is required. This advantage can be used by the production manager, depending on the requirement. Either the paper machine is run faster and thus produces more, or with unchanging speed less drying is required to save energy.

By means of the nozzle and valve technology used, OnQ ModulePro

*A simulation test shows: smaller droplets penetrate the paper substantially more quickly and achieve a homogeneous moisture distribution.*





The high-performance nozzle from Voith is attractive due to its spray quality over the large spray quantity range (1-25 l/h; 0-70 µm droplet size). The finer marking-free spray application leads to better paper quality, since the water penetrates the paper surface more quickly.

compact ensures a uniformly remoistened paper and an optimum moisture profile over the entire paper web. A homogeneous moisture distribution in the paper and reduced curling tendency are the result.

**Upgrade solution for existing re-moisturizers**

An inexpensive alternative to a complete replacement of an installed moisturizer is optimization with new dual-substance nozzles. For this, Voith Paper has developed a nozzle that can be mounted on existing external systems.

In contrast to competitors' nozzles, the OnQ ModulePro V30 upgrade nozzle has a finer spray pattern over a larger volume area. Nozzle replacement is done trouble-free by screwing out the old nozzle mouthpiece and screwing in the Voith V30 upgrade nozzle. The spray beam and the control remain untouched. Replaceability of the nozzle requires a detailed

technical examination in advance that is carried out by experts from Voith Paper. The OnQ ModulePro product line contains the suitable solution, according to the customer's requirement. Several examples show that not only can problems in the moisture profile be solved with the products described, but also increases in productivity can be obtained:

- In the case of a newsprint machine, OnQ ModulePro was used with a water application of more than 3.5 g/m<sup>2</sup> at speeds of over 1,900 m/min for moisture cross profile control and curl control. A moisture cross profile improvement (2-sigma profile) of over 65% was achieved. OnQ ModulePro allowed a stable moisture profile even with machine speeds of more than 2,000 m/min.
- With the installation of OnQ ModulePro compact with a zone width of 75 mm for corrugated cardboard, by means of one-sided remoistening the curling tendency

of the paper was considerably reduced by dissolving frozen tension. The result: a decline in customer complaints.

- After the upgrade of 200 zones of an existing external system at a European SC-A facility, it turned out that by means of a changeover to the V30 nozzle a substantially better moisture cross profile can be achieved.

**On Focus: OnQ ModulePro Product Line**

ProRunnability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ProQuality	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ProSpeed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section: drying  
Width: all  
Paper grade: all

**Contact**



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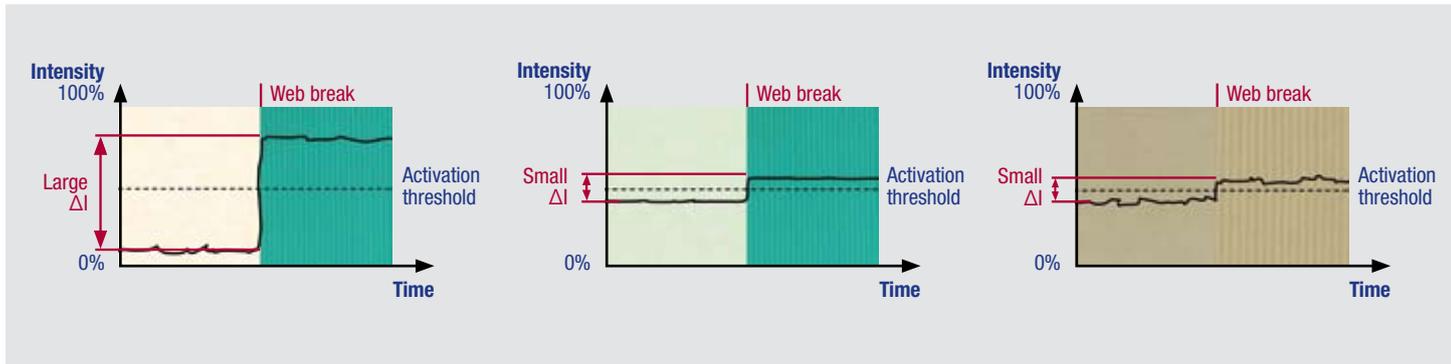


*Thanks to its special measurement, OnC WebDetect detects breaks even under the most difficult optical conditions.*

No more faulty detections

## Brown isn't just brown any more

**Optical differentiation between brown board and brown dryer fabric is a challenge for break systems. Unfounded break detections are thus often the consequence. However, thanks to another measurement procedure, OnC WebDetect functions more reliably than any other system.**



A slight color difference, for example, with transparent or packaging paper, make differentiation between paper web and dryer fabric difficult for color detectors.

The optical systems for web break detection that are current today usually do not work flawlessly. Since they detect a break by means of RGB detectors, they malfunction with difficult color relations such as in the case of a slight color difference between paper web and fabric in the dryer section. Thus – especially in the production of board and packaging material, faulty detections regularly occur since only with difficulty could existing systems differentiate between the brown web and the brown fabric. Transparent paper webs, as occur with low basis weights or high moisture contents, lead to the same problem.

on a new product – OnC WebDetect. In contrast to conventional color detectors, OnC WebDetect employs a measurement principle which uses special optical characteristics of the dryer fabric and the paper web.

The measurements are recorded successively at start-up and afterward used as references. Slight color differences, such as the ones that occur due to aging and fading clothing, are thus effortlessly coped with. Changing paper characteristics in the dryer section, e.g., moisture fluctuations, are likewise no longer a problem for break detection.

so that external light influences are compensated for and the measurement signal is filtered. The activation thresholds can thus be precisely calculated for a break alarm and adapted to the current production conditions on an ongoing basis. Since OnC WebDetect offers no image evaluation or cause analysis but instead a pure break detection system, the measurements can be evaluated almost without time lag. This allows a quick reaction in the case of breaks.

**Comfortably from the control room**

OnC WebDetect is integrated into the customer’s existing process control system by means of a Profibus interface or conventional inputs/outputs. Thus the referencing of fabric and web and further operation can be done comfortably from the control room. An adjustment directly at the electronic system on site is not necessary. Even at start-up, no special calibration or parameterization of the sensor electronic system in the field is

*With OnC WebDetect, slight color differences are effortlessly coped with.*

However, as a papermaker, if you don’t want to run the risk of unnecessary downtimes due to faulty break detections or even put up with the danger of machine damage due to undetected breaks, you can now rely

**Quick processing**

Along with the new measurement procedure, use of a microchip also contributes to reliable results. All measured values are processed in it

required. Only the sensor head has to be adjusted, which can be done by an automation expert from Voith.

Since OnC WebDetect was specially developed for and tailored to the paper industry, handling of the system is extremely user-friendly. In addition, OnC WebDetect is almost maintenance-free, since the sensor head is protected from contamination by air flushing.

**First customers convinced**

Already before the official launch, the first customers were convinced by the new product. OnC WebDetect was tested for several months under production conditions on the PM 1 of the Adolf Jass Schwarza GmbH paper mill in the Thuringian city of Rudolstadt.

The conditions in the dryer section of the PM 1 were until now a challenge for break systems: since

corrugating medium or test liner is produced, color detectors thus had difficulty in reliably detecting breaks.

However, things were very different with OnC WebDetect. After a short time, the system worked flawlessly and thus contributed to the smooth operation of the facility. Especially the simple referencing, which can be done manually or automatically via the process control system, make life easier. The operating personnel no longer has to run back and forth in order to set the sensors; instead, two mouse clicks suffice.

Due to the much lower outlay, referencing is done more frequently and thus there is very high reliability of the break detection.

The times in which the measurement signal fluctuated or slowly faded after a detected break are also a thing of the past. Through use of the

microchip with OnC WebDetect, changing production conditions have no influence on the functioning of the sensor and thus faulty break detections are prevented. The customer profits from increased production, since the machine is not shut down unnecessarily.

**On Focus: OnC WebDetect**

ProSafety	+	+	+	+
ProRunnability	+	+	+	+
ProSpeed	+	+		
ProSpace	+	+		

Section: drying  
 Width: all  
 Paper grade: all

**Contact**

 **Bernhard Dellekart**  
 bernhard.dellekart@voith.com



*“We will also rely on OnC WebDetect in the future.”*

*M. Habeck, Plant Manager, Jass Schwarza*



*“It was a big advantage for us that we were able to reliably detect web breaks in the pre-dryer section with OnC WebDetect. Thanks to the referencing on fabric and paper and the sophisticated technology, reliable break detection can be done even with a slight color difference. Constantly changing production conditions are no problem for the system as well. For that reason, we will also rely on OnC WebDetect in the future.”*

New technology with OnV PaperVision camera system

# LED lighting saves energy

**Investment in an efficient camera system pays off in the paper industry within a few months. Thanks to a new lighting technology, OnV PaperVision is also attractive due to noticeably lower operating costs than comparable competitors' systems. It is a development that also saves costs over the long term.**

It is well known in the paper industry that with a fully integrated camera system, 50% or more of the costs associated with web breaks and undetected defects can be lowered. The purchase costs of such a system are thus quickly recuperated.

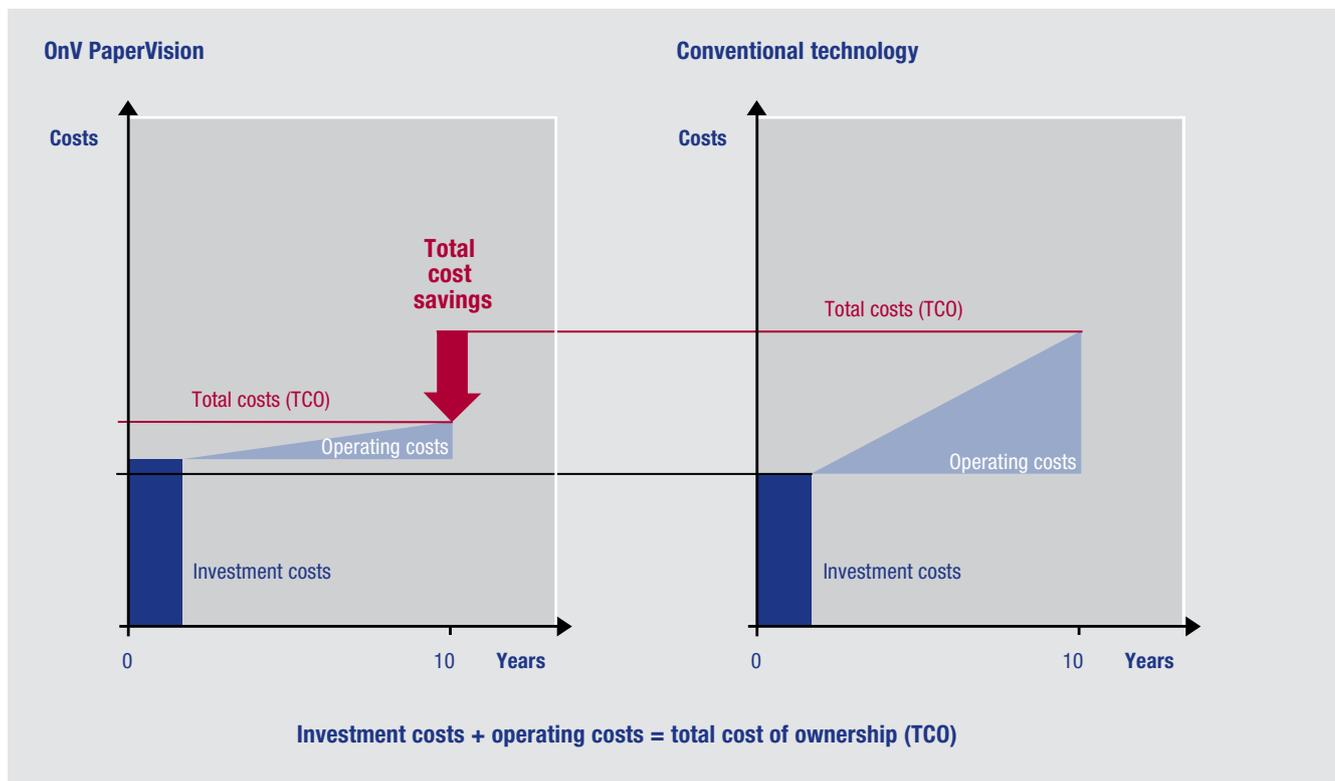
In addition to the investment, if you now consider the operating

costs over the service life of a camera system (so-called total cost of ownership, TCO), then there are substantial differences between the various providers.

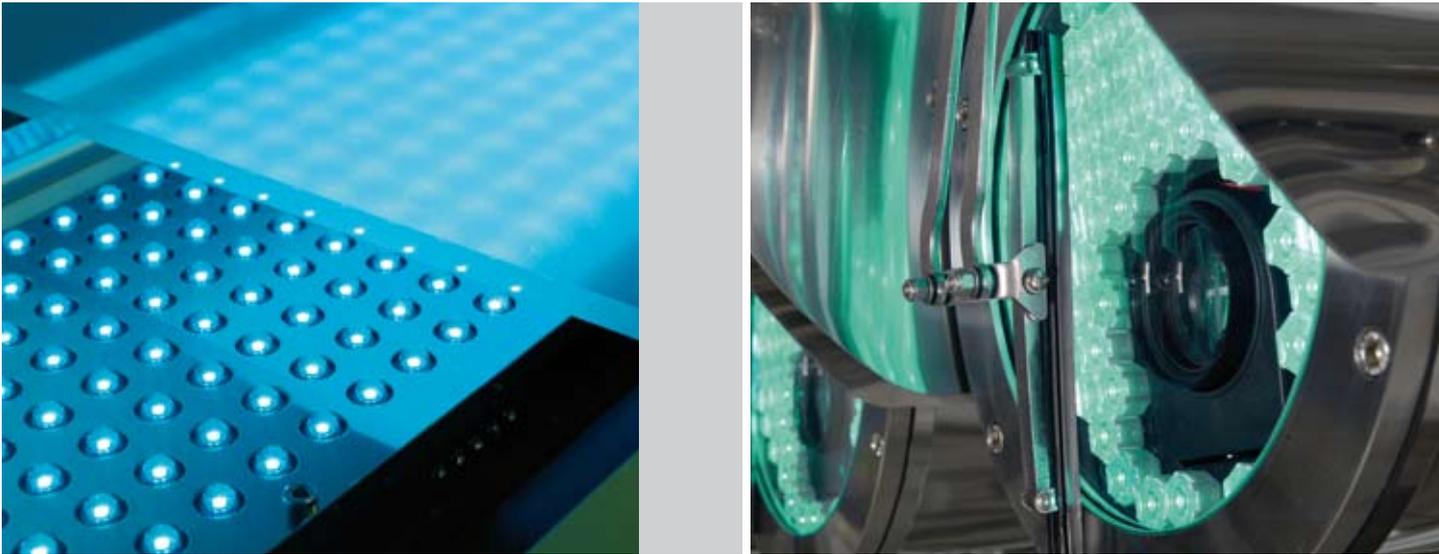
### Technology reduces costs

The OnV PaperVision system from Voith is attractive due to use of the latest technology resulting

in the lowest operating costs. The system, which combines web inspection (WIS) and web break analysis (WBA), uses LEDs. They are pulsed, i.e., the light is not permanently on, but instead is flashed in very short intervals. In comparison to conventional illumination, the operating costs are minimized by means of this method.



*OnV PaperVision is also attractive over the long term: In the case of a web break analysis system with 20 cameras, the operator saves 140,000 euros operating costs over ten years - only by the lower energy consumption.*



The new pulsed LED lighting of OnV PaperVision saves energy both during web inspection and also during web break analysis.

With a selected pulse duration of 100 microseconds and a pulse sequence of 100 Hz, the light is switched on only 1% of the time. Due to the high frequency, the human eye admittedly has the impression that the light is on for the entire duration. In this example, illumination of one LED-Cam thus requires only about 1% of the 712 W nominal power. Including the additional losses in the electronic system, altogether only ca. 23 W are consumed.

In the case of a web break analysis system with twenty cameras, about 140,000 euros in energy costs can thus be saved over a service life of ten years.

**Image sharpness thanks to light flash**

The short flashes of light are of very high light intensity, so that

the cameras produce brilliant images in previously uncommon resolution of all details – including formation.

However, since the light is switched on only briefly, the surface of the LEDs remains lukewarm. The danger of fire, e.g., under the dryer section, and the burning in of dirt are thus avoided. A further advantage is the noticeably longer service life of LEDs as compared to current industrial lamps, which leads to lower maintenance costs. In addition, the combination of cameras, electronic system and LEDs in an enclosure reduces the installation outlay, so that fewer costs accrue in this area as well.

Moreover, the LEDs can be equipped with different lenses and delivered in movable modules. Both the type and also

the intensity of illumination can thus be adapted to the need – a characteristic that is only insufficiently or not at all available with conventional technology.

**On Focus: OnV PaperVision**

ProSafety	+ □ □ □
ProRunnability	+ + □ □
ProQuality	+ + + +
ProSpeed	+ + □ □
ProSpace	+ □ □ □

Section: total paper machine

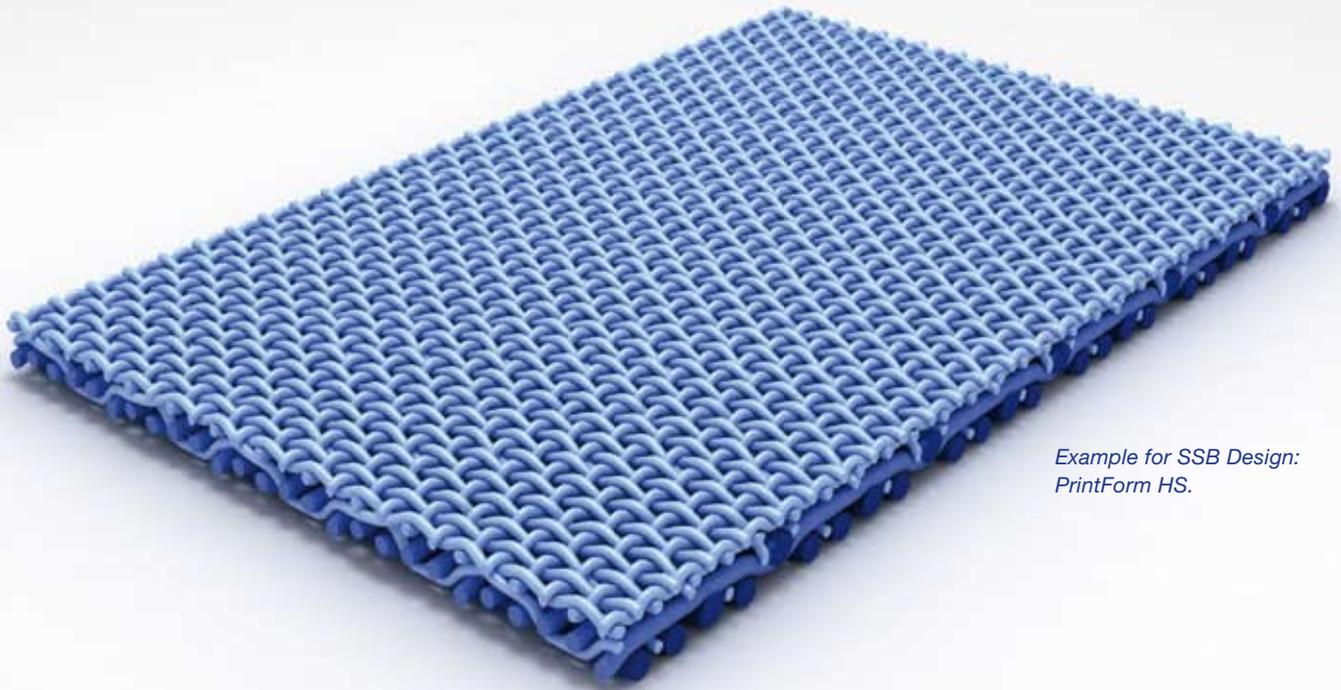
Width: all

Paper grade: all

**Contact**



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*Example for SSB Design:  
PrintForm HS.*

## Forming fabrics for a challenging grade

# Demands for newsprint fulfilled

**The introduction of color printing has caused a revolution in newsprint quality demands. The correct forming fabrics will help the papermaker to produce a top quality sheet without marking that will meet the current high quality standards for smoothness, porosity, formation, two-sidedness, etc. The best forming application to meet all these requirements is a balanced choice based on the specific performance demands and wishes from our customers.**

The main catalyst for this quality improvement in newsprint grades was the growing interest from professional advertisers for this medium. Newspapers have a huge advantage of high circulation numbers at relatively low costs, which enables advertisers to reach millions of people almost daily with up-to-the-minute offers and messages!

In order to keep the early adopters satisfied and attract new advertisers, the newspaper had to become a competitive medium in the world of advertisement papers

and is still seen as such today. Not only the print quality had to be improved, but simultaneously the speed of the printing presses increased significantly. New printing techniques have been introduced and modern, fast drying printing inks (often with an increased tackiness) were developed.

To keep up with the wishes and demands of the printing houses, the producers of newsprint were faced with some pretty interesting challenges. Significant improvements in surface strength and smoothness, a clear reduction of porosity and a

minimum two-sidedness were new targets to meet.

As if these challenges were not yet interesting enough, other industry trends also had to be dealt with at the same time. Paper needs to be produced on ever wider and faster paper machines. Higher percentages of recycled fibers are used and thus furnish quality deteriorates. Finally there is also the trend towards lighter paper weights to save costs, which makes things even more complicated. How to control print through, dusting, hickies, smearing and linting?

Many disciplines in the chain of the modern papermaking process needed to come up with inventive solutions to help the paper producers to meet the demands of the printing houses.

Paper machine builders, producers of paper machine clothing, chemical companies and filler suppliers have helped the paper maker with their challenges. The result is impressive: a top class 45 gsm newsprint sheet from 100% recycled fiber, produced at 120 km/h on an 11 meter wide machine can meet the quality and runability demands required by the most modern printing presses.

**Forming fabrics for newsprint**

Nowadays, SSB fabrics are the number one design for modern newsprint machines. The benefits from this design versus conventional fabrics have been widely recognized and accepted. The newsprint industry has been among the first to try this new fabric design and are still receptive to new ideas.

**Benefits of SSB fabrics**

The answer to this question could differ per individual user. However, the most common advantages are:

1. Reduced fabric marking
2. Reduced chemical consumption
3. Reduced porosity levels
4. Improved fabric life
5. Clean run
6. Good profile quality

Most of these benefits are a result of the huge step in FSI and support points when changing from a fine DL to

SSB fabrics. With its plain weave fabric surface and the fine MD and CD yarns on the paper side, SSB fabrics more than tripled the amount of support points and more than doubled the FSI numbers in comparison with the fine DL designs.

The reduction of marking when replacing a fine DL with an SSB fabric is evident, especially on those machines that use 100% recycled furnish. The typical 8 shed diagonal disappeared and the very fine “screen” from the SSB surface is often hardly visible with the naked eye.

Also a clean fabric run, with low fiber carry back and reduced fiber bleeding are positive effects of the higher support points and FSI numbers.

“We are convinced there is an SSB solution for every newsprint machine in the world. The right application will provide our customers certain benefits versus conventional designs. We proved how successful our clothing is on the fastest newsprint machines,” said Martin Serr, Business Development Manager Forming/Europe.

**New challenges**

Among the major PMC suppliers, there is a fierce competition going on to have the finest SSB design in their product range. However, all PMC suppliers are facing certain limitations when going finer and finer with their SSB designs. In order to further increase the FSI numbers and the amount of support points, more yarns per centimeter have to be used in the weave, which

will have consequences for the surface open area if the diameter of the yarns is not reduced. And this is the very crucial point! The physical properties of the finer yarns are a major concern to the industry. How can the necessary stability be achieved from 0.08-0.10 mm yarns? How can the elongation figures be controlled? Will these super fine yarns have enough resistance against high pressure showers, etc.?

At first glance, two contradictory trends are running simultaneously. On the one hand, paper machines are getting wider, faster and running with higher fabric tensions, while on the other hand, the forming fabrics are getting finer and finer!

Today, PrintForm HS and HQ are very successful designs on the market that help papermakers improve the quality of their paper and increase efficiency of the machine. But there is more to come in the near future.

**On Focus: SSB fabrics**

ProEnvironment	++	□	□
ProRunnability	+++	□	
ProQuality	++++		
ProSpeed	+++	□	

Section: forming  
 Width: all  
 Paper grade: all graphical grades

**Contact**



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New forming fabric generation with a unique warp concept

# PrintForm I combines a fine paper side with a stable machine side

In order to meet the higher quality demands of the customer, even finer and thinner forming fabrics were developed for graphical papers. They guarantee very good formation and an even paper surface. The new Voith Forming Fabric PrintForm I combines the advantages of a fine forming fabric with those having a very stable machine side structure. The main advantages are lower water and fiber carrying, higher dimensional stability and less rewetting.

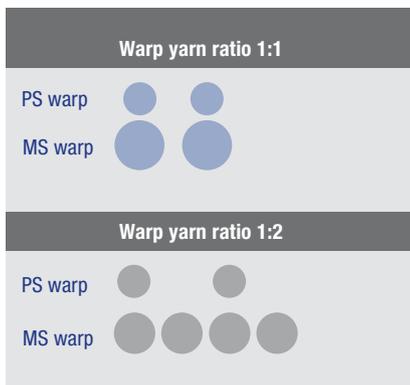


Fig. 1: Cross section comparison of SSB fabrics with warp yarn ratio 1:1 and 1:2.

The fabric construction is the same as an SSB forming fabric (SSB = Sheet Support Binder). This is triple layer with a paper side and wear side layer as well as a binder connecting these layers, which joins the structure on the paper side. Until now fabric constructions have had a warp ratio of 1:1 or 1:2 (paper side and wear side respectively). The paper side layer is principally responsible for the ideal formation of the paper and in order to do this must have the finest structure possible. The wear side layer must fulfil the fabric's requirements for stability in the machine and cross machine directions as well as lifetime on the

paper machine. This is achieved through the use of weft and warp yarns with clearly different diameters on the top and bottom fabric layers.

A finer fabric top side and more stable or rather durable machine side can be achieved in the PrintForm I with its 3:2 warp count ratio that has been introduced.

With this new warp concept, a fine paper side fabric layer is combined with a stable wear side fabric layer to create a new type of forming fabric. The warp cross section of this PrintForm I and one of a standard SSB forming fabric with a warp ratio of 1:1 are laid on top of each other.

The advantages of the PrintForm I Series are illustrated in Fig. 2.

### Less water and fiber carrying

The paper side warp and weft yarns have very thin diameters which are tightly woven to achieve a monoplane surface. In spite of the resulting high fiber support index (FSI) and over 11,600 support points per in<sup>2</sup> (1,800 support points per cm<sup>2</sup>), the PrintForm I has a sufficiently large open surface area. The thin yarns lead to a lower fabric caliper and consequently to a lower, more open void volume. This provides the following advantages for the papermaker:

Fig. 2: Warp yarn ratio standard SSB 1:1 over PrintForm I with yarn ratio 3:2.

Benefits PrintForm I	
Quality	Stability
1. Homogeneous paper side = FSI and SP higher	4. More space available on MS for larger weft diameters
2. Lower caliper, less water carrying	
3. Impulse absorption for low marking tendency	

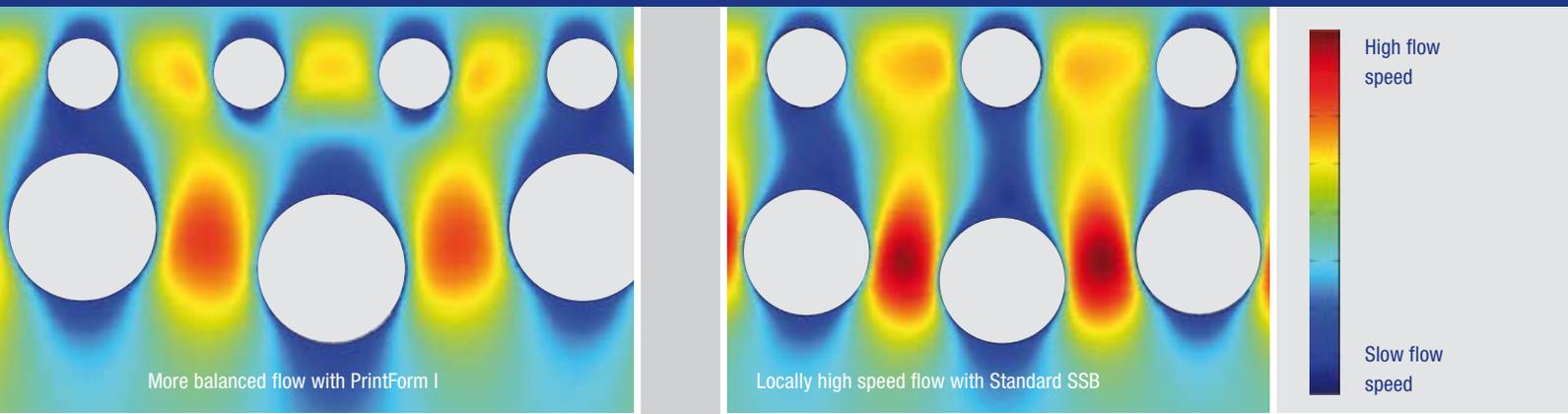


Fig. 3: Flow speed through the warp system.

- Higher dewatering capacity due to an open fabric structure.
- Build up a homogeneous fiber web as a result of high number of support points.
- Higher mechanical retention properties.
- Reduced risk of fiber carrying because of the fine paper side.
- Reduced risk of water carrying due to a reduced fabric void volume.

**High dimensional stability**

The I-Series warp mesh is lower on the machine side through the use of yarns with the same diameters. As a result, more space is created for a higher number of weft yarns or bigger weft diameters. Consequently, in both cases, the dimensional stability and in particular, the cross dimensional stability of the fabric is increased. The advantages are:

- Good cross machine paper profile as a result of the higher fabric cross machine stability.
- Good lifetime properties due to the high wear volume.
- Efficient fabric cleaning because of the open warp structure.

**Less rewetting into the paper web**

The concept of the unique 3:2 warp ratios of the PrintForm I makes the offset of the warp layers to each other possible. The offset of the yarns prevents rewetting into the paper web, as can happen when the fabric meets drainage elements. Consequently this leads to a uniform paper structure and results in a better formation. The open machine side warp structure supports the drainage flow and ensures optimal dewatering. Because of this even higher dewatering results may be achieved.

In Fig. 3 the influence of the warp geometry on the drainage is simulated, while with the 1:1 warp ratio local, higher speed flows occur. These are more balanced with the 3:2 warp ratio. The result is a more uniform and higher flow capacity in comparison to the 1:1 warp yarn ration. The advantages for the papermaker are:

- Better and more homogeneous formation.
- Higher dry content due to reduced rewetting into the paper web.

**Results with PrintForm I**

Trials were carried out on several pilot paper machines under comparable conditions. As a reference, fine graphical SSB fabrics, which are standard for the paper grade, were used. As an example, with SC-A pulp, a super fine SSB bottom fabric was interchanged with a PrintForm I, both with the same permeability. The top fabric was not changed. Higher initial dewatering results were obtained with the

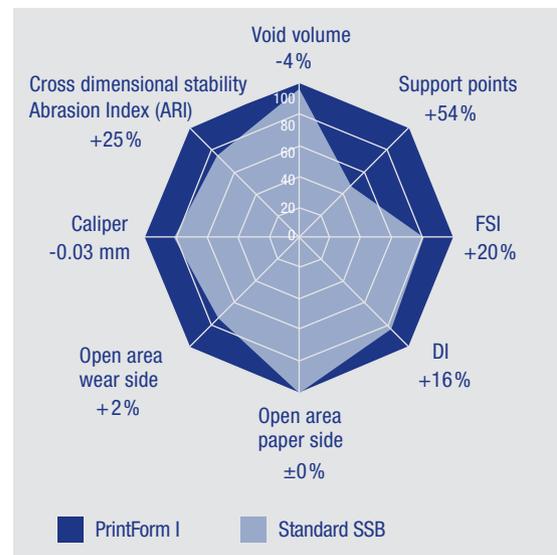


Fig. 4: Comparison of the technical data of a standard SSB and PrintForm I.

PrintForm I in all cases. All other dewatering conditions in the former remained constant. The dry content at the Pick-Up is increased by up to 1.5% (Fig. 5).

These results have been confirmed in production plants, where formation has been clearly and immediately improved. On a Fourdrinier paper machine, producing wood containing papers, the formation, all measured by Ambertec, was already improved at the first tambour after installation of the PrintForm I and again after opening the headbox slice up to 0.12 [ $\sqrt{g/m}$ ] (red curve in Fig. 6). As a reference, when the standard SSB forming fabric was used, a formation value of 0.65 [ $\sqrt{g/m}$ ] was achieved (grey curve).

The qualities of the PrintForm I have been confirmed in performance and additional benefits have been seen:

- Higher dimensional stability, flat fabric surfaces in the return part of the PM.
- Lower water and fiber carry.
- Lower fresh water consumption due to pressure reductions in the cleaning system.
- Higher dewatering capacity.
- Improved formation and paper cross machine profiles.
- Increased dry content at the Pick-Up.
- Higher fabric life potentials.

As a result of the unique warp concept of the PrintForm I, a fine paper side can be combined with an extremely stable wear side. The open wear side in particular ensures highly efficient dewatering. The offset of the warp layers leads to a homogeneous drainage and enables good formation. This forming fabric design is especially suitable for positions on paper

machines which have high demands for dimensional stability and higher paper quality at the same time.

**On Focus: PrintForm I**

ProEnvironment	+++
ProRunnability	++++
ProQuality	++++
ProSpeed	++

Section: forming  
 Width: all  
 Paper grade: graphical grades,  
 high quality board & packaging

**Contact**



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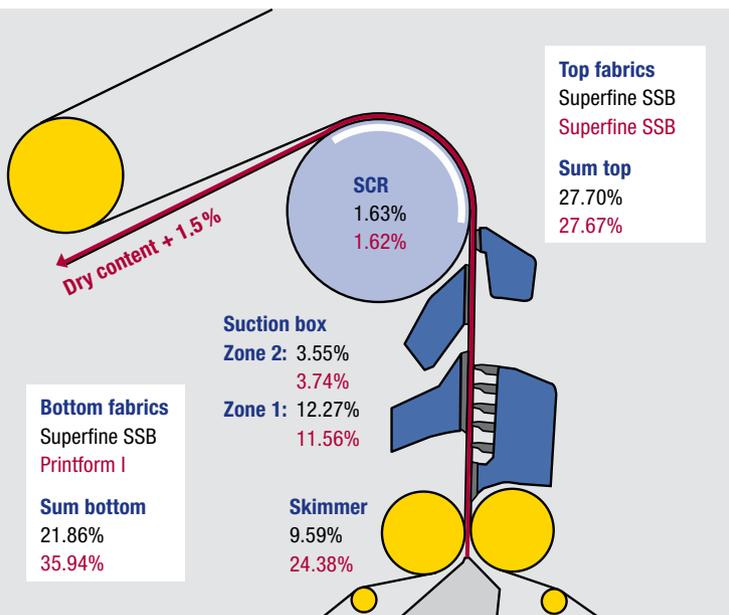


Fig. 5: PM Drainage Results with SC-A+. Increase of dry content by + 1.5%.

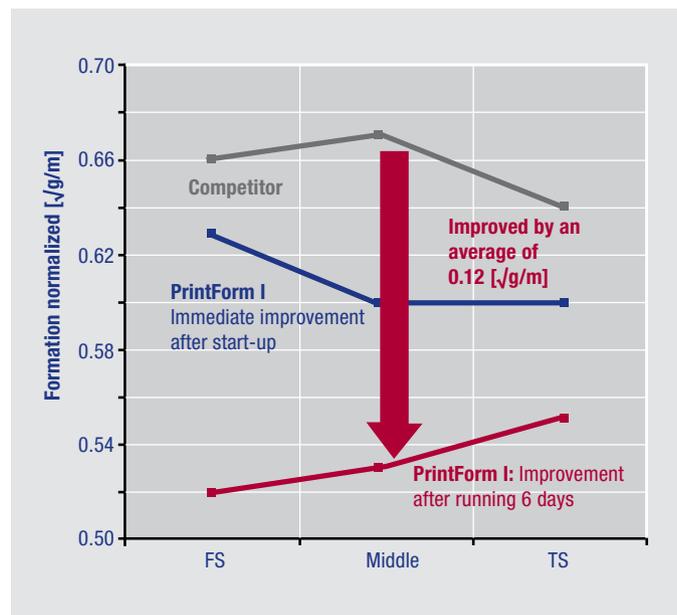
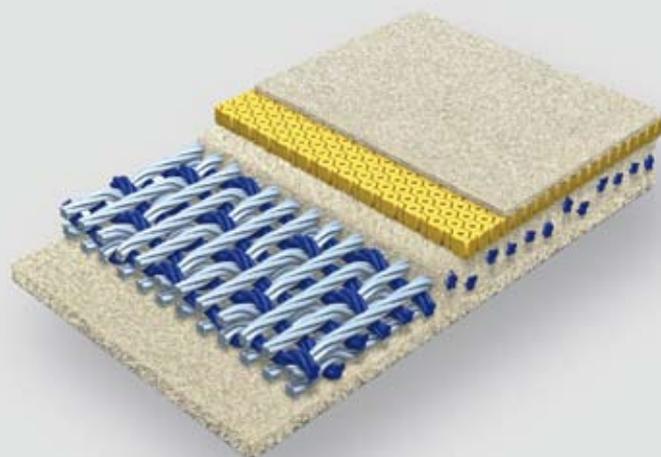


Fig. 6: Sheet Formation – Measured with Ambertec.



*PrintFlex V3 Planar for critical pick-up positions.*



*E-Flex, optimally structured felt for maximum dry content.*

### Increase efficiency within the press section

## It's not only the clothing that matters

**If the dry content after the press can be increased by 1%, the steam consumption for drying the paper web is reduced by 4%. To achieve this target, every dewatering opportunity in the wet section must be exploited. Points of approach could be the clothing, the rolls and roll covers as well as the doctoring.**

Provided the web leaves the forming section with maximum dry content, then the greatest possible dry content must be achieved in the press section. This can be achieved not only by optimizing the design of the clothing, but also by suitable roll covers and roll surfaces. The method of doctoring as well as the conditioning of rolls and felts must also be taken into account.

A press felt is expected, with consistent clothing characteristics, to deliver highest dry content with relevant paper quality. It is true that the dewatering performance was and still is seen not so much as an energy saver, but rather as a means of increasing the machine speed to its limit. The important parameter was seen as the increase

in tonnage, not so much the energy saved. But since the cost of energy is rather unpredictable, except for a constantly increasing trend, the energy consumption of all the potential consumers in the press section is increasingly scrutinized. Dry content and drive power are under constant observation. The values for vacuum-consuming units (suction rolls, suction boxes or guiding equipment for the web) and of course also the line loads are recorded.

#### Contribution of clothing

The objective of a modern press felt design is to meet the changing requirements. From the start, press felts should require the lowest possible mass per square meter

and allow only minimal deviations of the relevant operational parameters, such as the permeability or the active felt volume. All of this should preferably not require the use of suction box dewatering and conditioning. Every press makes its own demands. To meet these, Voith Paper places its bets on the advantages of modularly structured press felts. Using only a few components combined according to specification, optimal designs are created for every type of press position, based on woven and non-woven technology.

#### Non-woven technology

The latest press felt designs are based on non-woven technology,

i.e. fibers running lengthwise and across, with no interconnection within or between fibers. Non-woven structures hardly change their properties required for paper production. These felt designs therefore start up very quickly and offer excellent dewatering performance in the nip, over their entire lifespan.

To date, these advantages were of use only in the production of graphic paper. After targeted development work and thanks to a special manufacturing process, Voith Paper opened up the fast-moving packaging sector as well for the non-woven technology. To date, these applications were not amenable to the use of non-woven felts due to soiling and specific dewatering properties. Apart from producing a new design, the modularity of this technology also produced an entire product range, the Planar family. Planar designs can be applied with almost all paper types and press positions.

**New technologies for press felts**

Structurally optimized felts offer additional options for optimizing dewatering, paper web transfer and also paper and cardboard quality. The first possible option is the side of the press felt in contact with the paper. The intention is to maximize the contact area. The possibilities include modified batt fibers (bi-component fibers) on the one hand, and optimized steps in batt production and application (PrintFlex/ MultiFlex P and PRO) on the other.

Two further topics have recently appeared on the horizon: the elasticity of the substructure and the distribution and size of the felt pores. These two characteristics decisively determine the dewatering performance and preservation of the properties through the life of the felt. The desired characteristics can be controlled by the introduction of special polymer particles into the felt structure. Extremely smooth

felt surfaces and permanently elastic felt structures are revolutionizing press dewatering.

**Roll covers**

The support of the relevant roll cover in the press position is required in order to fully exploit the dewatering potential of a felt in the nip. The Solar family sets new standards for roll covers, especially for highly stressed positions. The open surface and especially the associated groove design provide clearly improved water drainage. This in turn forces dewatering of the felt in the nip.

This illustrates the interaction between felt and roll cover design. Voith Paper supports the optimization of the open surface of the press roll, especially of the grooves, by using suitably stable press clothing. This bridges the grooves and simultaneously maximizes the flow of water into the surface of the cover.

**On Focus: Planar Family**

ProEnvironment +++

ProRunnability +++

ProQuality +++

ProSpeed +++

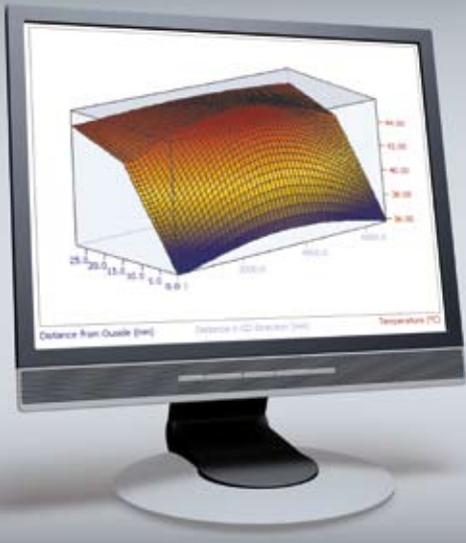
Section: press

Width: all

Paper grade: all graphic papers, all boards

Planar Family	
PrintFlex 02 Planar:	Extremely fast start-up, good dry content
PrintFlex 03 Planar:	High dry content, reduction of two-sidedness
PrintFlex V2 Planar:	High nip dewatering, long life
MultiFlex 03 Planar:	High dry content, fast start-up
MultiFlex V2 Planar:	Good cleansing properties, constant dewatering performance
MultiFlex V3 Planar:	High resistance to compaction, easy cleaning
MultiFlex S3 Planar:	Elasticity and uniform dewatering performance at high speeds

*Overview of the Planar Family.*



Nipmaster, analyses the interaction of roll cover and felt.



Press section of the Paper Technology Center in Heidenheim, Germany.

### Analysis of the press nip

NipMaster is a software package that simulates the press gap considering the line load, roll cover, felt and paper quality. The program was developed to calculate the thermo-mechanical conditions under which a roll cover operates. Using NipSense, these theoretical results can be tested on site by measuring the actual conditions in the machine. The results of the measurement form the fundamental base for further nip calculations.

The parameters of the press clothing are continuously updated to ensure that they are as realistic as possible. The predictive power and insight of NipMaster is demonstrated by the results – up to 120 values per Nip calculation.

### On-going supervision of the roll press clothing

A certain control of the press felts is provided by the service staff of the

press clothing manufacturers. In most cases, these are instantaneous recordings, with the commensurate difficulties of interpretation. For definite trends in support of decision making, reference is made to FeltView, installed for on-going monitoring of the felt. FeltView measures the moisture, permeability and temperature of the press felt during production. The data is always available and evaluation of long-term trends assists optimization with respect to energy savings, fresh water and roll clothing.

Voith Paper offers a total package focusing on efficiency improvements in existing press sections. This includes simulation of thermo-mechanical conditions in the press nip (NipMaster), steady state analysis of the press nip (NipSense), the selection of optimal roll covers and associated efficient doctoring, as well as the ideal clothing. The total package also includes the option of investing in FeltView for permanent press felt control. Overall, they

highlight potentials for saving and optimization.

Reducing the solid content after the press by 1% yields a 4% saving in steam. Therefore, the equation  $+1 = -4$  is no arithmetic error – it highlights the hidden potential of the press.

#### On Focus: PrintFlex / MultiFlex PRO

ProEnvironment	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
ProRunnability	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
ProQuality	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
ProSpeed	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>

Section: press  
 Width: all  
 Paper grade: all graphic papers,  
 all boards

#### Contact



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Solving winding problems for paper producers

## LunaReel: A new generation of reel drum covers

**Paper producers know: winding problems mean wasting paper. Plus, winding problems also mean big trouble for printing presses and copying machines. To reduce these problems, years ago Voith Paper developed rubber reel drum covers. And now, Voith Paper is introducing a new generation of high-tech reel drum covers: LunaReel.**

In the past years, practically all new high-speed paper machines producing coated and/or calendered paper have been equipped with rubber reel drum covers. By comparison, older machines without rubber covers often waste considerable amounts of paper due to unwanted winding problems. Typical winding problems include: misalignments, blow-outs, creasing, stretching, glossing marks and interlocking.

Illustration 1 shows the function of a soft reel drum cover. The soft nip, between the reel and the tambour, allows the paper to be pressed uniformly. During paper winding, this soft nip minimizes trapped air pockets and other disruptions which are a main reason for winding problems.

The following questions however, should be answered before installing a reel drum rubber cover:

- Will a rubber reel drum cover really solve the winding problems?
- Are the technical controls compatible or should they be adapted?
- Are mechanical modifications required?

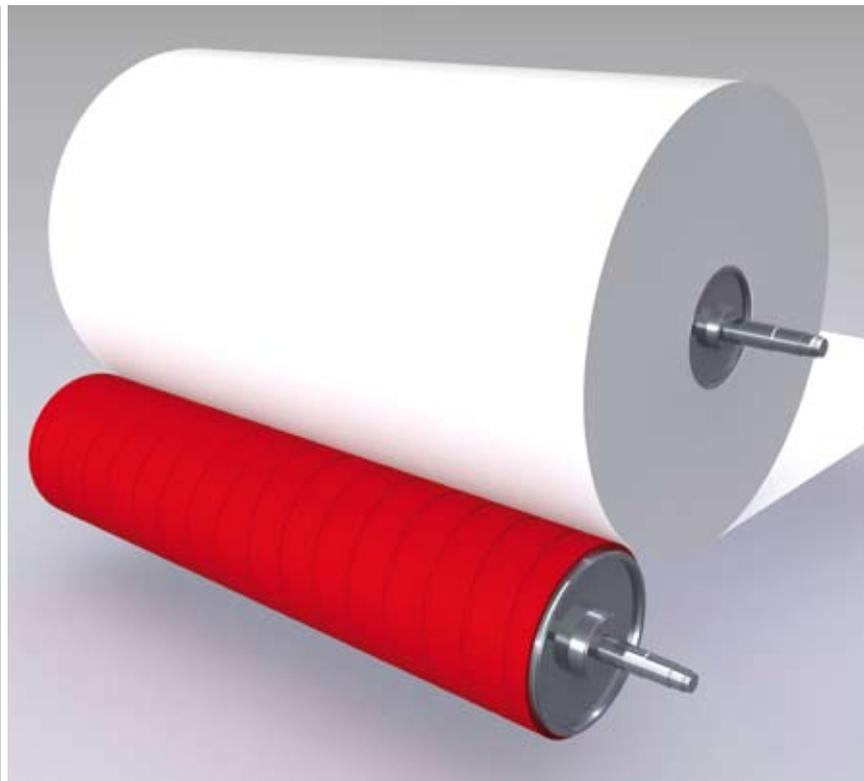
Through a Voith Paper pre-audit, these and other questions can be answered. Current problems are then examined in detail and the entire system's improvement potential can be evaluated. These are key considerations, because rubber reel drum covers need to be routinely regrinded, and a spare roll is usually recommended. In general however, for older paper machines it takes 12 to 15 hours to change over the reel drum.

### The LunaReel Concept

The new LunaReel concept offers paper mills two different types of reel drum covers – to match their operating needs: the LunaReel S and the LunaReel E.

The LunaReel S is the standard version with high-tech fiber-reinforcements. While the LunaReel E is the extra-strong version, offering added mechanical stability with higher abrasion resistance and running times of over 18 months.

Fig. 1: Reel drum in contact with paper.



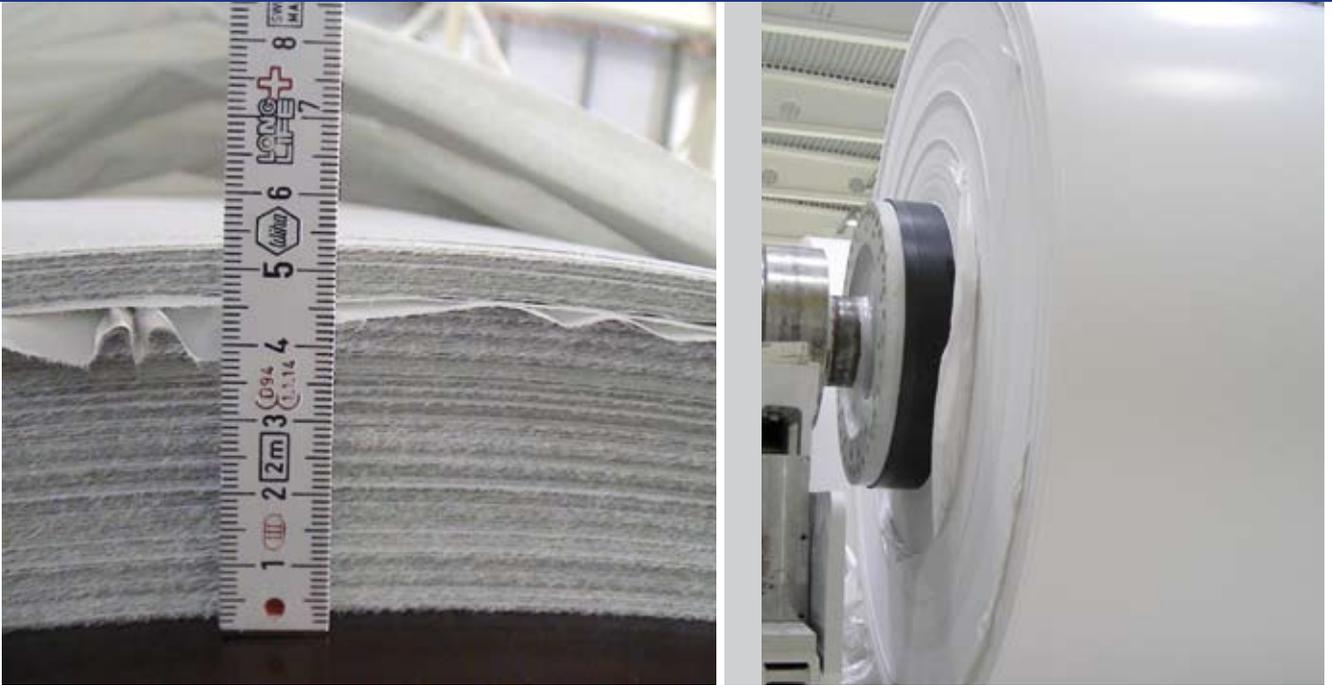


Fig. 2: Examples of winding defects.

Both versions of the LunaReel are based on Voith Paper's extensive production experience and advanced materials research.

As a result, LunaReel offers customers major advantages:

Longer running times thanks to fiber-reinforcements, higher abrasion resistance and mechanical stability. LunaReel covers have a uniform nip which minimizes tearing as well as other problems. Plus, LunaReel covers retain these characteristics throughout their lifetime: LunaReel covers barely weaken with age – they don't get hard – they don't crack; furthermore, a reliable, uniform coefficient of friction throughout the lifetime for more precise handling of the paper web.

Throughout the development the following aspects were considered:

On the one hand, high-tech materials in LunaReel covers give them a better

grip or hold on the paper. Here, special filling materials are used which give the covers a rougher appearance – but this does not affect the paper's sensitive surface. This is big advantage, because uniform reel friction means non-stop paper production – without changing the tambour's winding settings.

On the other hand, increased mechanical stability of the reel drum cover occurs through fiber reinforcements. As a result, tearing on perforations and splitting through paper winders can be avoided or reduced to a minimum.

The start-up operation can be supported by Voith reeling experts, including the optimization of winding settings and onsite training for local production teams.

The change to rubber reel drum covers improves paper quality and the amount of waste paper can be reduced by 100 to 200 tons every month.

**On Focus: LunaReel**

ProRunnability      
 ProQuality

Section: reeling  
 Width: all  
 Paper grade: coated and/or calendered papers

**Contact**



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The ideal doctor for hard roll coatings

## SkyTop delivers brilliant results

Roll covers enhance the efficiency of a paper machine. To gain the greatest possible benefit from roll covers, doctor blades have to be perfectly matched to the cover's properties. Voith Paper's SkyTop doctor blades offer a special product combination for hard roll coatings. The result: extended operational life and enhanced paper quality.



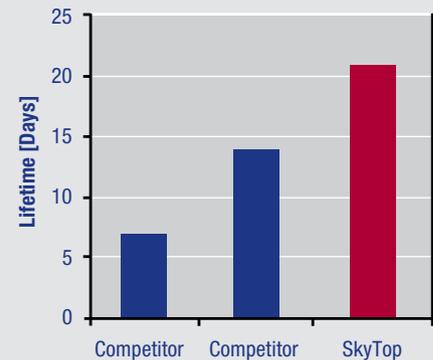
At Norske Skog Bruck in Austria, doctoring deposits in the third press were affecting the operating properties of the central press roll. The use of >>> SkyTop doctor blades over a longer period reduced doctoring deposits and extended blade life from 14 to 21 days.

In addition, the company was not satisfied with the original blade life in the fourth press take-off position. Because of extensive wear, the blades had to be replaced after seven days, resulting in more downtime. Installing SkyTop doctor blades tripled blade life to 21 days. SkyTop doctor blades are now being applied

*SkyTop is tailored to the requirements of hard roll coatings.*

### >>> Information: SkyTop

SkyTop is a fiber composite made up of carbon fiber and duroplast matrix with finely distributed cleaning and polishing particles. This combination results in excellent cleaning and conditioning of the roll surface. The surface roughness and excellent sheet release properties of the roll coatings are maintained throughout the entire roll life.



*Service life of SkyTop compared with competing blade products.*

successfully in the third and fourth presses on the thermal-coated press roll covers.

The combination of SkyTop with a TerraGloss coating also produced outstanding results. After experiencing recurring problems in the calender section with lifetime and inadequate gloss standards, the customer applied a TerraGloss coating. The new installation allowed the default gloss factor of 60 to be maintained for far longer compared to the uncoated rolls. However, after a time, initial signs of milky deposits again reduced the gloss factors of the LWC paper.

Only after the conventional carbon blades were replaced with Voith SkyTop blades could the roll surface be kept clean and, consequently, the gloss values in the product maintained in the long term. These examples prove that proper, precisely tailored doctoring of the thermal roll coatings enhances the efficiency

of the paper machine. The coatings can only work to their full potential when the doctoring process is top-rate.

**Reducing maintenance costs**

Another considerable benefit of SkyTop is a decrease in downtime, resulting in a reduction in maintenance costs. A paper machine can be out of operation for up to 12 hours while a roll is being changed compared to only 30 minutes to replace a doctor. SkyTop increases roll lifetime by means of improved yet gentler cleaning of the thermal coated roll surfaces. In the case of the doctors used previously, the blade contact pressure had to be increased regularly to maintain cleaning performance at the same level. With SkyTop, this is no longer necessary. This means that coating and doctor blade are exposed to fewer stresses, and the lifetime of both components is extended.

The success of SkyTop demonstrates how important it is to tailor doctor blade and cover to one another. Particularly on demanding paper machine positions, a measurable added value can be achieved for the paper mill.

**On Focus: SkyTop doctor blade**

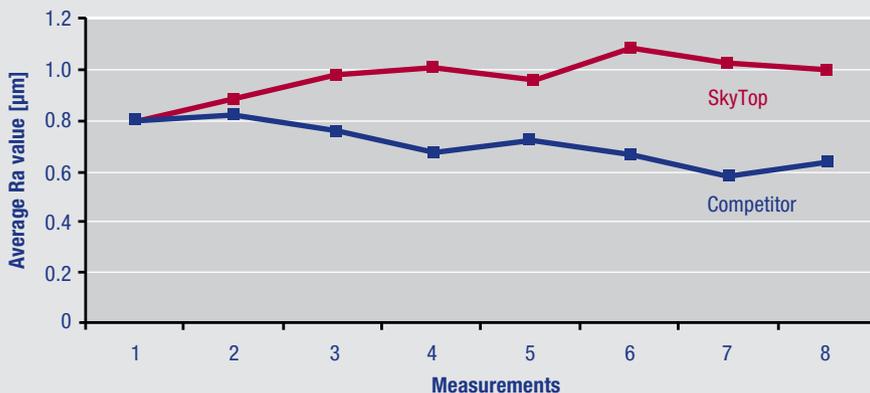
- ProRunnability
- ProQuality
- ProSpeed

Section: press, calender  
 Width: all  
 Paper grade: all

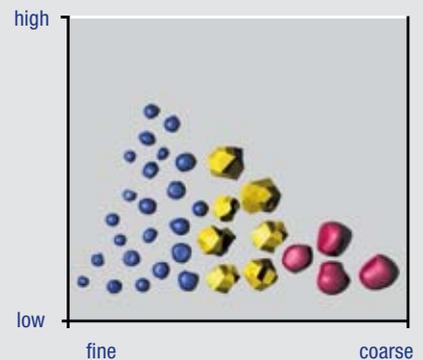
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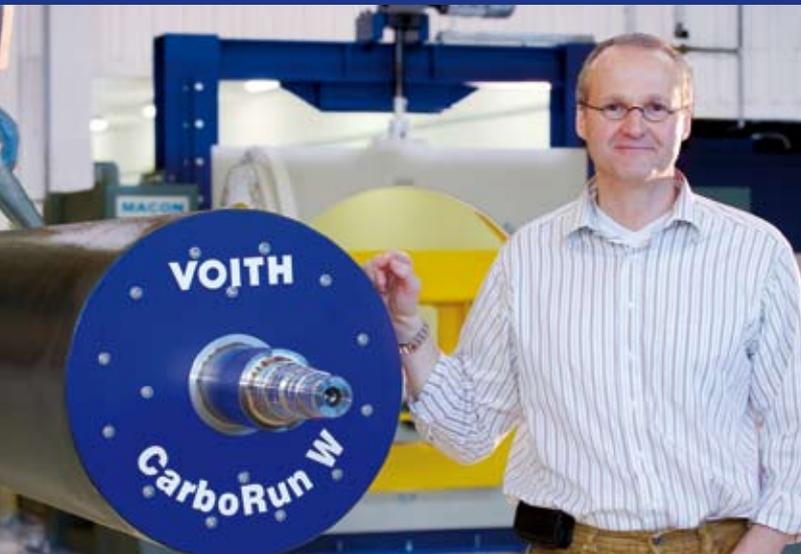
**Ingo Schmid**  
 ingo.schmid@voith.com



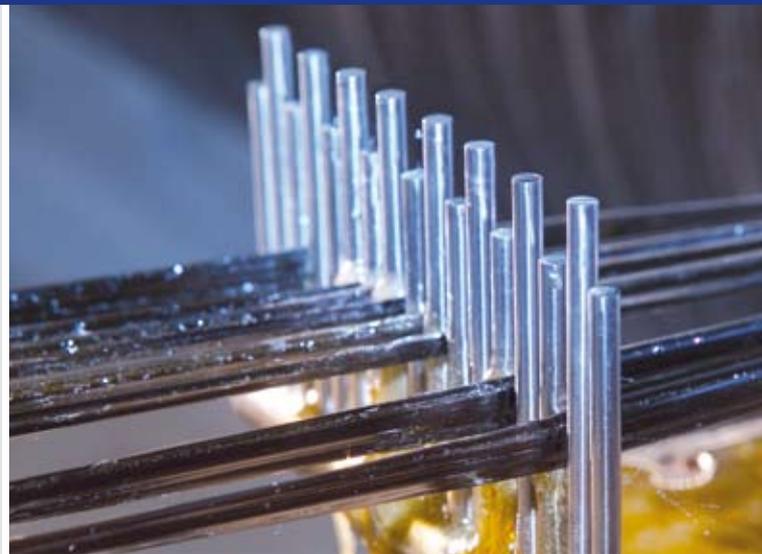
*SkyTop provides consistently high coating surface roughness over the entire operating life.*



*Filler particle sizes in cleaning and conditioning blades.*



Thomas Maurer standing beside one out of the 100 CarboTec rolls which were produced for the Hainan (China) paper machine.



Special made OCS (oval cross-section) fibers to produce composites with a more precise structure than standard fibers.

**Voith develops its own advanced materials for CFRP rolls**

## Lightweights: Carbon fiber rolls

**The new Boeing 787 uses it. And the Airbus A350 does too. Formula 1 cock-pits are even made out of it, as well as tennis rackets. What we're talking about is "carbon fiber reinforced plastic" or CFRP. And Voith Paper also uses this advanced composite in its premium rolls.**

For 15 years, Voith Paper has produced advanced "CarboTec" rolls from CFRP in its Wimpassing, Austria facility – and since 2006 they have been made using an ultra-modern production line. The latest installation of CarboTec Rolls was at the Mondi Business Paper plant in Hadera, Israel. There, CarboTec Rolls from Voith Paper are especially admired for their ability to absorb vibrations. Thanks to the structure of their CFRP composite, the paper mill's new dryer fabric rolls have significantly lower vibration levels. When compared to conventional steel rolls, which had serious vibration problems, CarboTec Rolls having the same diameter are now far stiffer. As a result, the paper machines can be run at even higher speeds without the rolls developing critical vibrations.

The reason for these reduced vibrations is the higher dampening ability and stiffness of CFRP rolls. In technical terms, the higher a material's elasticity modulus or >>> e-modulus is (i.e. the relationship between the applied tension and the resultant expansion shown by a material), the stiffer a product becomes. For example, steel rolls have an e-modulus rating of 220 gigapascal (GPa) while carbon composite rolls have ratings from 240 to 700 GPa. CFRP rolls therefore also permit more precise online calibrations during production as well as improved workplace safety.

### Multi-Directional Fibers

Fiber composites can now be manufactured with precisely the right material

characteristics to satisfy a particular application. And Voith Paper uses this technology for its CarboTec rolls.

Through precise arrangement of the carbon fibers, CFRP composites can be made with extremely effective dampening characteristics and a specific thermal expansion coefficient. In addition, unlike steel rolls, CFRP rolls do not need to be run-up in advance to reach a uniform operating temperature. As a result, the waste paper associated with production start-ups can now be significantly reduced. CFRP rolls can also be operated at temperatures up to 125°C, and for short periods even up to 140°C. Plus, thanks to their internal structure, CFRP rolls usually have a smaller diameter than steel rolls.

In its CarboTec rolls, Voith uses its own specially made OCS (oval cross-section) fibers to produce composites with a more precise structure than is possible with standard fibers. Thanks to this improved structure, Voith composites reduce air and moisture inclusions and minimize microcracks. This means CarboTec Rolls have a major advantage, especially when operating in moist or humid conditions. CFRP rolls are also comparative lightweights: a cubic meter of carbon fiber composite weighs 1.5 tons, while a cubic meter of steel weighs five times that amount. For that same reason, the CFRP rolls in paper machines are easier to operate and have lower power requirements.

**100 CFRP Rolls for Hainan, China**

Voith also uses specially developed materials for its roll covers, such as

**>>> Information: E-Modulus**

The e-modulus (also called: elasticity modulus, coefficient of elasticity or Young’s modulus, being named after the physicist Thomas Young) is a characteristic value of solid materials. In the material sciences, e-modulus values describe the relationship between the applied tension and the resultant expansion of a solid object when it is deformed. Simply put - the e-modulus measures elasticity. The term “elasticity modulus” is often abbreviated as “e-modulus” or “E.” Large e-modulus values for a material indicate a high resistance to deformation. For example: Construction materials with a high e-modulus value, such as CFRP, are stiff. Materials with a low e-modulus value, such as rubber, are flexible.

special epoxy resins. These resins further strengthen the roll and absorb vibrations. This is particularly important in the drying section of a paper mill, where aggressive steam is part of the operating environment and rolls need to be both heat as well as hydrolysis resistant. In the prospective world’s most productive fine paper machine in Hainan, China for instance, Voith Paper supplied a press section with

100 CFRP rolls – all of which have special coatings made from composites, polyurethane or rubber. Even the re-coating of a CFRP roll is simple. Seeing the stiffness of a CFRP roll doesn’t change after use and practically no bending occurs – an old coating can be easily removed and renewed using special TLT (thermo layer technology) coatings.



*Schematic illustration of a CarboTec roll with composite cover.*

**On Focus: CFRP rolls**

ProSafety	+ □ □ □
ProEnvironment	+ + □ □
ProRunnability	+ + + +
ProQuality	+ + + +
ProSpeed	+ + + +
ProSpace	+ + + +

Section: total paper machine  
 Width: all  
 Paper grade: all

**Contact**



**Thomas Maurer**  
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Rapid repair of spreader rolls

## Minimized waiting & maximized service

**Spreader rolls are critical for the wet and dryer part of every paper machine: directly affecting processing felts as well as paper web quality. Voith Paper experts use their great experience with rolls for the maintenance of spreader rolls.**



*Disassembling of a spreader roll.*

“The main thing is, the roll is running again” – This kind of comment is pretty typical when spreader rolls are repaired. But it’s not the whole story. Truth is, there are huge differences in “how” these expensive rolls are serviced. Voith Paper has a comprehensive service concept and an entire department dedicated just to spreader rolls. What makes Voith Paper services so fast is firstly the longtime manufacturing and installation know-how: Voith Paper experts know each and every type of roll configuration. Secondly – Voith Paper service teams prepare precise inspection reports that really pay-off for customers.

“Our service reporting sets a new standard,” explains Martin Bassmann, Sales Manager Austria, Germany and Switzerland. During an on-site analysis, Voith Paper experts examine roll problems in detail. Most importantly – they track down and correct the causes of break-downs, so problems don’t re-occur. Here, detailed reporting adds transparency by listing all essential time-sensitive repairs as well as possible improvements, including a clear cost estimation. Altogether, this makes it easy for customers and Voith experts to identify the best and most cost-effective solution. “Thanks to these

reports, customers always have an overview of their services. Added to that, once customers select a repair – these reports help ensure the fastest possible service,” adds Bassmann.

**Lubricants are important too**

Most spreader roll problems start with their bearings. And often, that’s because the wrong lubricants were used. Here too, Voith Paper’s expertise helped to develop an innovative lubricant specifically designed for spreader rolls.

*“We can modify each roll, to match its operating conditions.”*

Helmut Bammer, Voith Paper Laakirchen, Austria

The results: an extended lifetime and minimized bearing wear. In many cases, the installation of a central lubrication system or the conversion of an existing system may also be a sound investment.

Before and after each Voith Paper service, rolls also undergo vibration testing and a frequency analysis – onsite in the paper machine as well as on a test rig. If desired, additional sensors can also be installed to permit online monitoring of a roll’s vibrations and temperatures for more effective preventative maintenance.

“We can modify each roll, to match its operating conditions,” reports Helmut Bammer, Manager Roll

Service in Laakirchen. This involves not only construction modifications, but also special coatings, such as: tungsten-carbide-teflon or chrome-carbide-teflon coatings. In addition, roll segments can be converted from rubber to steel, or steel to rubber. For example: in a paper machine’s sizing press, several spreader rolls were used with conventional rubber covers – but due to a heavy fouling, they only lasted a few months. In 2004 however, these rolls were replaced with steel rolls having a carbide-teflon coating and ever since – they’ve run problem-free.

**The fastest service**

Voith Paper offers very fast spreader roll services. Here the broad supplier network gives the service a head-start – assuring quick deliveries of suitable bearings, couplings and seals. Added to that, Voith Paper operates its own in-house repair facilities.

“On average, we service steel rolls in about four weeks, and it only takes six or seven weeks for rubber rolls,” says Martin Bassmann.

Despite Voith Paper’s quick response times, customers still shouldn’t postpone routine inspections. “Many times, spreader rolls are just run too

long and then breakdown unscheduled,” comments Bassmann. Routine scheduled maintenance of these rolls however, makes good sense: Production outages can then be managed – rather than just happening, and major damages can be avoided. Regardless of a roll’s original manufacturer, Voith Paper offers services that can extend every roll’s lifetime.

A spreader roll’s performance can be enhanced by using approved spare parts: such as clutch components or seals. Today, Voith Paper service centers are located in: Laakirchen (Austria), Kunshan (China) and Jakarta (Indonesia). Voith Paper has many successful service projects, including spreader rolls in the world’s fastest (2,000 m/min) and widest (11 m) paper machines.

**On Focus: Spreader rolls**

ProRunnability	++++
ProQuality	+++
ProSpeed	++

Section: total paper machine  
 Width: all  
 Paper grade: all

**Contact**



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## Cost reduction by mathematical furnish modeling and potential analysis

# PerfectFit for furnish recipes

**Voith's furnish modeling and furnish potential analysis is a tool for cost optimization for graphical paper grades. The main focus of these studies are furnish recipes, refining of the components, filler content, basis weight and machine speed. The critical weak points concerning furnish strength can be identified and proposals for their amendment can be discussed.**

In today's economic situation, over-capacities and predatory competition force every papermaker to reduce costs to stay competitive. There are two main ways to reach this goal: optimizing the furnish recipes or increasing the machine speed. Which way promises more leverage is mainly determined by the machine concept.

Up to now, it was not possible to determine the optimum future operating point concerning furnish composition and the resulting furnish strength. Neither was it possible to calculate the possible maximum machine speeds. Voith's furnish modeling and furnish potential analysis closes this gap.

### Balance out requirements and possibilities

The basis for such a study is, of course, the paper machine itself. This may be an existing machine which is to be optimized or a planned new machine. The machine requirements concerning the sheet and therefore the furnish strength properties can vary hugely; The main influence parameters defining the machine requirements are the paper grade, basis weight, machine speed and, of course, the machine concept. The furnish compositions have to fulfill the requirements in every case under all circumstances (Fig. 1).

In order to evaluate the balance of the furnish strength potential and the PM requirements, the single fiber and filler components are analyzed in detail. The available fiber and filler components are evaluated together with the customer with the aim of optimum cost efficiency. At the same time, more advantageous alternatives are looked for and discussed.

As a next step, the selected single components are evaluated and optimized individually. Subsequently, the suitability of the optimized single component for mixtures is tested. For the assessment of existing machines,



*Fig. 1: PM requirements and furnish properties in balance.*

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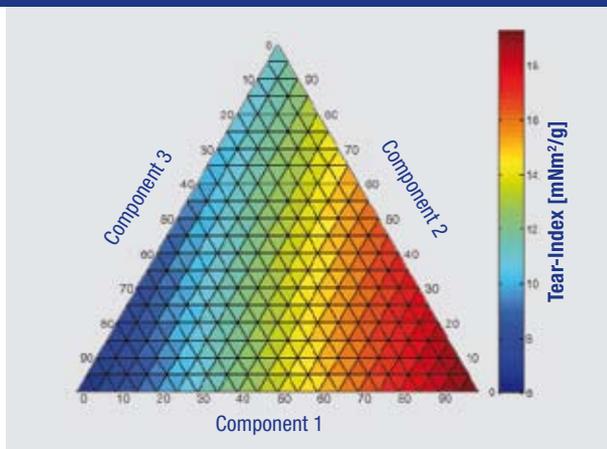


Fig. 2: Tear-Index diagram for a furnish model with three fiber components.

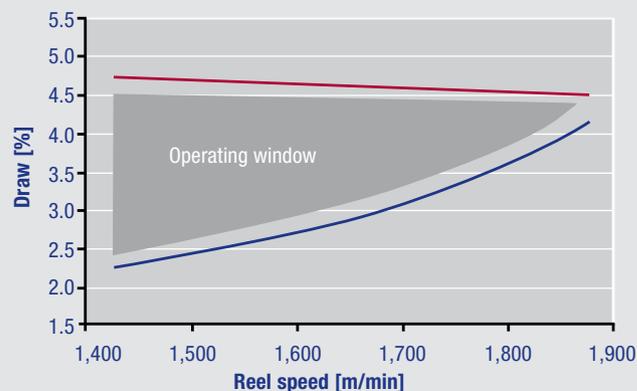


Fig. 3: PTC draw trials allow furnish limitation predictions.

the furnish samples are mostly taken directly from the stock preparation lines. If this is not possible, e.g. for planned new machines, the chosen fiber components can be refined in lab scale or full scale in the Voith research facilities.

### Continuous prediction of the mixtures' strength properties

The properties of the single components are now known. But how is it possible to predict the sheet strength that can be achieved with a certain furnish composition?

For this goal, a series of mixtures of the base components is made in the lab and hand sheets are produced from every mixture. The necessary minimum number of different mixtures depends exponentially on the number of base components. From these hand sheets, all important paper properties are measured. The center of attention focuses on the strength properties, the initial wet web strength at different dryness levels as well as the commonly used static and dynamic strength of the dry sheets. This procedure is

mandatory because the mixtures typically do not follow linear mixing rules but show complex non-linear dependencies.

The strength parameters measured for the different furnish mixtures are then described by fitting mathematical equations. As a result, predictions of the strength properties are also possible for furnish compositions that have not been measured on hand sheets.

The results of the mathematical modeling can then be displayed in interactive software tools and in diagrams (Fig. 2).

### Wide knowledge base from the PTC

Depending on the selected machine concept, especially the press configuration, different requirements for the sheet strength are resulting. In order to determine the strength requirements, comprehensive trial series have been carried out at the Voith Paper Technology Center (PTC) in Heidenheim on the pilot paper machine XPM 6.

With different raw materials, basis weights and machine concepts, trials have been run to determine the minimum necessary and maximum possible draw for different speed levels. At the same time, hand sheets were produced from the trial furnishes and the strength properties of the wet and dry sheets were measured.

With the operating windows defined during these trials (Fig. 3), predictions can be made concerning:

- the maximum speed that can be reached with a certain furnish strength and a defined machine concept
- the minimum draws and therefore the minimum necessary strength properties at a certain speed and a defined machine concept

Nevertheless, the results from the pilot paper machine have to be examined critically in every case to verify their validity for full scale paper machines.

Comparative evaluations with actual production machines show the transferability of the pilot scale strength

requirements and complete the knowledge base. The data base is continuously expanded and improved by using all available information from PTC trials, customer projects and optimization work.

**Leveling out the balance**

The mathematical modeling of the strength properties on the one hand and the machine requirements on the other hand allow it to divide the model space into possible and impossible furnish mixtures (Fig. 4).

This division is made for each examined basis weight and machine speed. Proposed rebuilds changing the machine requirements are also accounted for. These conclusions allow the customer to estimate the answers to the following questions:

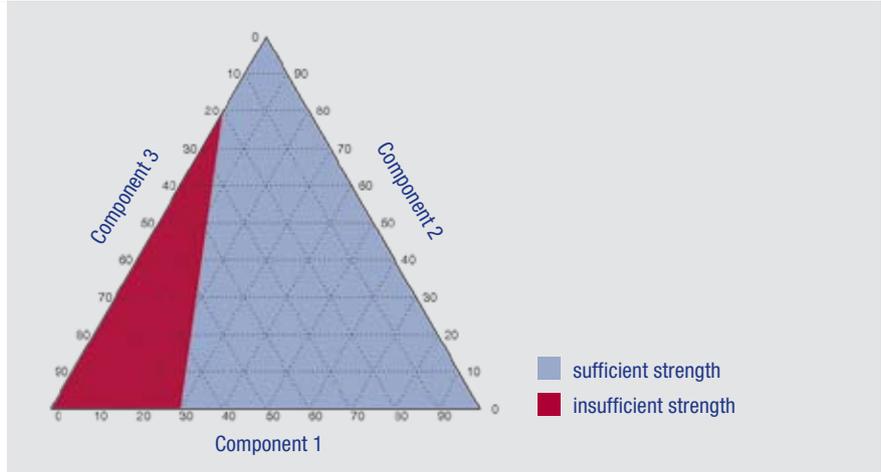


Fig. 4: results of the furnish potential analysis for 3 fiber components: Furnish mixtures with sufficient (blue area) and insufficient strength (red area).

- How much can be saved by optimized furnish usage and/or refining?
- What possibilities are there to increase the machine speed?
- How fast will investments pay for themselves through possible furnish cost reduction?

Thus, furnish modeling and potential analysis can contribute decisively to cost reduction and increased competitiveness.

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*“Alberta Newsprint Company (ANC) is extremely pleased with the front end research work performed by Voith to aid in the design of our shoe press.”*

*Gary Smith, Technical Director, ANC Whitecourt*

*“Alberta Newsprint Company (ANC) is extremely pleased with the front end research work performed by Voith to aid in the design of our shoe press. ANC will be faced with the challenge of utilizing inferior Mountain Pine Beetle killed fiber from saw mill residual chips. The chip moisture content will range down to 25%. We also expect higher pitch extractives from the freshly attacked trees. Voith lab work illustrated the potential benefits we would derive from installing a shoe press. This will allow ANC to increase the use of inferior fiber while maintaining paper quality for the printers ensuring ANC’s long-term viability.”*



Once the OnS FindSet is connected to an actuator and power supply, there is nothing else in the way of the check.



Safely stowed away but easy to access, thanks to the practical service case.

## Reliable and easy diagnosis

# OnS FindSet closely examines actuators

**Trouble-free quality control is one of the foundations for smooth operation of every paper machine. For that reason, Voith has developed a new analytical tool to quickly and comprehensively check the functional capability of cross-profile actuators.**

If an alert of an actuator malfunction appears on the screen, the search for the cause of the fault begins. As a precaution, the reported actuator is replaced, but often the malfunction is not so easily eliminated. If further messages appear, it becomes difficult to determine the fault. Without exact diagnosis, the operator is dependent on a “trial-and-error” procedure until the respective actuators are either cleared or determined to be the cause of the malfunction.

Actuators can now be localized more quickly and in a much more targeted fashion with OnS FindSet. The device allows a comprehensive check of all motor-operated cross-profile actuators from Voith – regardless of whether it’s done directly on the paper machine or in a dismantled state on the workbench. Thanks to the menu-driven analysis, the device

is easy to operate and localizes any malfunctions within a few minutes.

### Clear malfunction assignment

With OnS FindSet, any possible malfunctions can be quickly diagnosed and the full functional capability of an actuator can be identified. Thus, only faulty actuators are dismantled and only error-free replacements are reinstalled. With OnS FindSet, all functions, operating states and the individual components of a motor-operated actuator can be checked. Even sporadically occurring malfunctions can be discovered with a longer test lasting several days.

With an average of 150 cross-profile actuators on a paper machine, the new testing device is an investment that quickly pays off. Even if just one actuator is saved from replacement

without cause, e.g., because its functioning is impaired due to contamination, the purchase costs are already paid. In addition, the paper mill service personnel can identify malfunctions in a targeted fashion, and thus, much troubleshooting time can be saved.

### On Focus: OnS FindSet

ProSafety ++++

ProRunnability ++++

Section: CD profile controls in headbox, press, and coating section

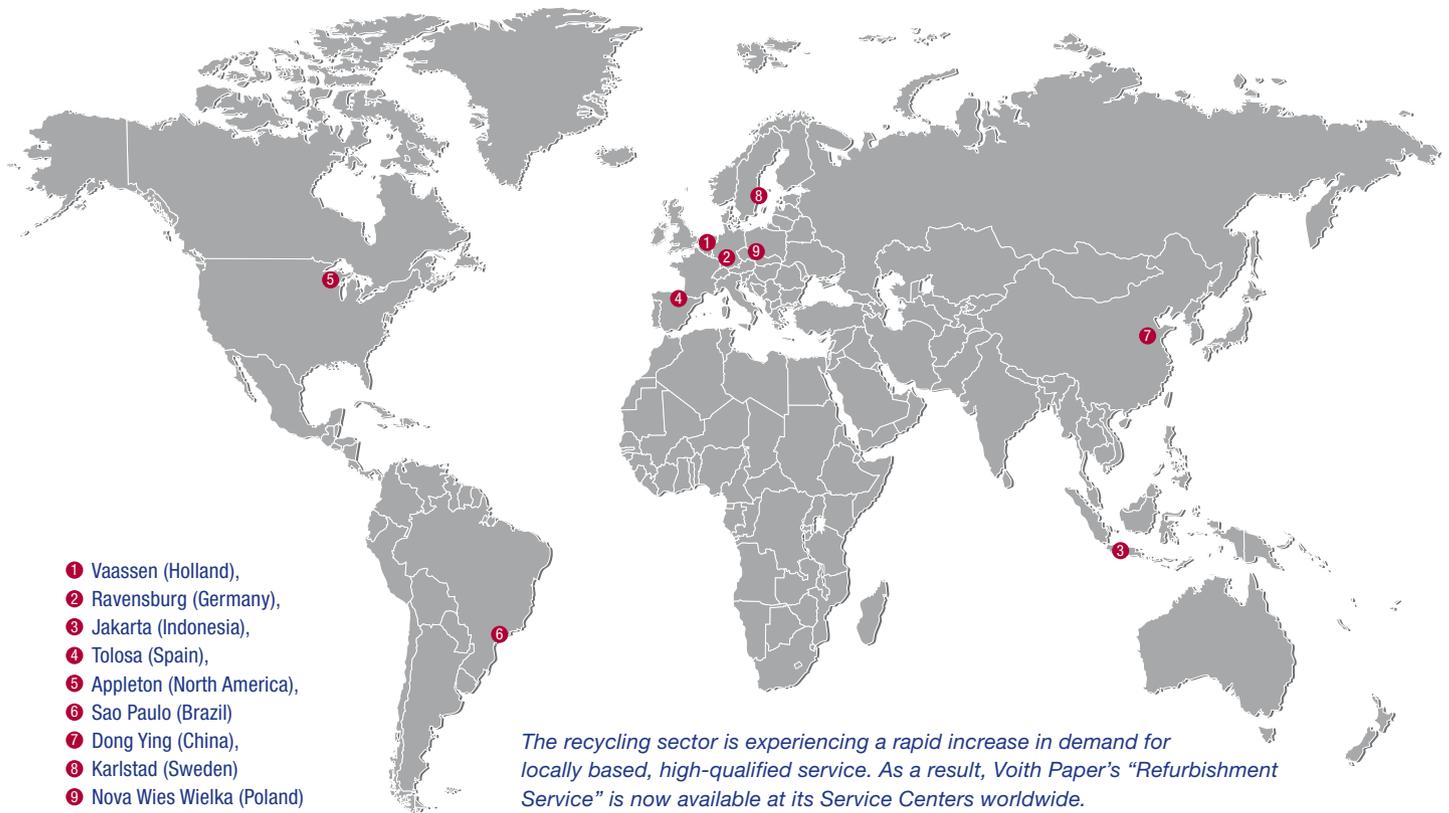
Width: all

Paper grade: all

### Contact



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- 1 Vaassen (Holland),
- 2 Ravensburg (Germany),
- 3 Jakarta (Indonesia),
- 4 Tolosa (Spain),
- 5 Appleton (North America),
- 6 Sao Paulo (Brazil)
- 7 Dong Ying (China),
- 8 Karlstad (Sweden)
- 9 Nova Wies Wielka (Poland)

*The recycling sector is experiencing a rapid increase in demand for locally based, high-qualified service. As a result, Voith Paper's "Refurbishment Service" is now available at its Service Centers worldwide.*

## Keeping rotors in swing

# Worldwide service for long-lasting stock preparation

**Metal clips, wood pieces, glass and other garbage – recycled wastepaper contains much more than just cellulose fibers and fillers. These contaminants will, over time, wear down the rotating parts inside the process equipment to such an extent that the equipment's critical design geometry will change. Voith Paper has launched a comprehensive service to restore these parts – saving substantial energy, cutting maintenance costs, and ensuring reliable operation.**

The effectiveness of stock preparation systems typically hinges upon how long the hardworking parts inside the machinery can withstand the constant wear and abrasion posed by trash in the furnish. This is because changes to the parts original design geometry will not only reduce production level and stock quality. It also can result in higher energy consumption as well as fiber loss. These concerns are particularly true for rotors operating in pulping

and detrashing equipment as part of a fiber-recovery process. That's why Voith Paper has created a specialized service that concentrates on repair and maintenance of rotors and extraction plates used in these critical stock preparation machines.

### **Expertise in welding technology**

All Voith Service Centers can repair and refurbish the precisely tuned working surfaces of worn rotors from

any manufacturer. Because rotor maintenance is such a specialized, labor-intensive, and time-consuming task, Voith experts have been specially trained to meet the most exacting quality standards. Special welding techniques and materials make rotor surfaces abrasion-resistant, corrosion-resistant, and, most importantly, re-weldable. Without removing the existing material these resurfaced rotors show a high resistance to cracking that dynamic stress can induce. In

addition, our experts weld high dense, wear-resistant edges to the rotor's working surface, further extending the lifespan of this critical component. Our experts use a special welding wire, produced to Voith Paper specifications.

**Proven to be more economical**

Rotor geometry directly affects energy consumption in a stock preparation system, and, accordingly, the production cost per ton of recycled fiber. Restoring that geometry can sustain the optimal balance between minimized operating costs and maximized technological performance. For example, suppose a recycled paper process annually produces 100,000 tons of recycled fiber with acceptable flake content at the pulping loop of 20% and a design pulping energy consumption of 17 kWh/t. Wear on the pulper rotor adversely impacts energy consumption at this phase in the process to the degree that by the time the rotor is considered worn out. It requires 20kWh/t to maintain the 20% acceptable flake content. At an energy

cost of 0.05 €/kWh, repairing the rotor and restoring the original geometry could save 15,000 € (US \$20,416). "That's because a worn-out rotor, or an overhauled rotor that does not meet OEM specifications, has geometry variations which increase the whole system's energy consumption in order to achieve the same flake content levels," explains Thomas Jap from the Jakarta Service Center. Accordingly, Voith Paper always uses original equipment manufacturer (OEM) specifications and guarantees the high quality of all repairs. Voith Paper technicians always begin with an onsite analysis to determine what repair is necessary and schedule the work to ensure readily available replacement parts. Thanks to the company's global service network, most rotor refurbishments can begin immediately. In 2008, one of the newest Service Centers opened in Dong Ying, China. "In our new Service Center we benefit from our close working relationship with Voith Paper in Kunshan. Thanks to that, we can provide fast and reliable rotor refurbishment services," says Jintao Zheng, Service Manager at the Dong Ying Service Center.

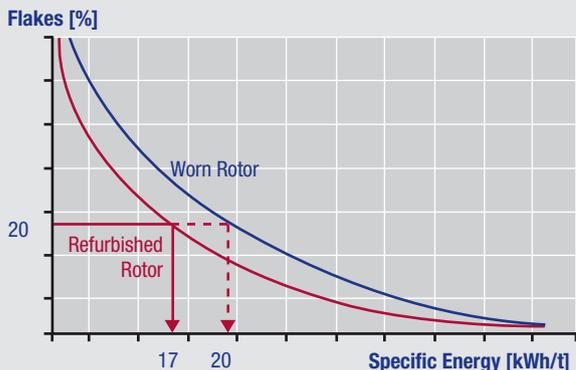


*In depth knowledge from welding technology and materials is required to bring the rotor back to its original design geometry.*

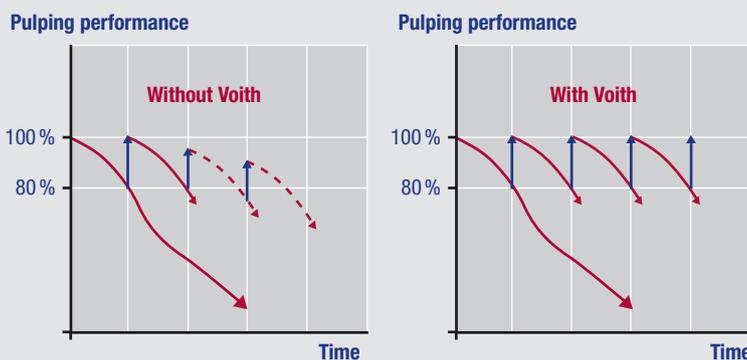
**Contact**



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*Energy savings: A refurbished rotor consumes 17 kWh/t to achieve a flake content of 20%. A worn-out rotor, however, consumes 20 kWh/t to reach the same flake content.*



*Successful repairs: This graphic depicts the results of routine rotor refurbishments at a Dutch paper mill. Since 1991, Voith Paper has refurbished these rotors, which still have their original geometry. Some rotors have been overhauled more than 30 times.*

Paper makers get active

## Calender roll barring

**Barring in calenders is a very old topic. But the R&D activities around this vibration phenomenon have increased. Now there are new solutions to prevent barring on calender rolls. This applies both in the case of deflection compensation rolls in soft calenders and also with elastic middle rolls in multi-nip calenders.**



Fig. 1: Nipco axis with active support elements.

Barring means that an elastic roll in a calender has a polygon-like pattern on the surface in a circumferential direction. The pattern is always a whole-number multiple of the roll's rotational frequency. Sometimes it can be seen with the naked eye. It can be detected much more reliably via a concentric running test with high resolution (Fig. 2). In this example, 36 waves can be clearly recognized on the circumference of the roll. These waves on the roll surface arise within a few days; sometimes it takes a few weeks. In addition, a parallel sound measurement clarifies the problem: 120 dB(A) at a distance of one meter from the calender. That is as loud as an airplane starting up. It is clear that there is a problem here for operation of the machine, especially for the paper makers who have to work at such a loud machine. Parallel to the rise in volume, for the most part the paper quality also gets worse. In part, the barring pattern on the elastic roll

surface can also be detected in the paper. Then it is time to change the elastic roll in the calender. If this roll change has to take place outside of the normal downtime scheduled for the machine, then overall efficiency suffers.

### Wear as a trigger for barring

Previous investigations show that barring arises due to wear on the roll surface in connection with a multitude of natural frequencies and natural modes. This is because the elastic roll surfaces wear out due to the rolling process in contact with paper during satinage by about 80 to 200  $\mu\text{m}$  per roll service life – even without barring. If in addition to normal roll wear barring arises on the roll surface, then it is audible with a wave of about 1  $\mu\text{m}$ , and with a wave of about 20  $\mu\text{m}$  a noise level of +120 dB(A) or higher arises. Wear characteristics with barring can be improved through, among

other things, use of the especially abrasion-resistant NanoPearl calender roll cover. This cover features the latest calender cover technology. Introduction of the two-component particle system further optimized the nano-particles. They improve the firmness and stiffness and at the same time have a damping effect in the case of impact stress.

### Barring in the paper maker's daily routine

The interplay of high-frequency vibrations of the roll stack, the associated natural modes and wear in the development of barring has been studied in detail but is not well understood. This has not prevented Voith from working out solutions that substantially lengthen the service life of elastic rolls. An example of this is the EcoSoft calender of the PM 2 at August Koehler GmbH in Kehl. The calender is for production of thermo-

base paper at speeds of ca. 1,600 m/min. Barring appeared again and again on the Nipco roll with an average service life of ca. 20 days. Measurements of operating vibrations showed that three different barring patterns accumulated on the elastic roll surface at the same time (170 Hz, 670 Hz and 933 Hz). A complicated case. Due to the simultaneous occurrence of three high frequencies, it quickly became clear that a simple passive measure or hydraulic damping alone could not solve the problem. An adaptive and at the same time active system for the Nipco roll was thus developed in order to substantially increase the service life of the roll.

Nipco rolls are deflection compensation rolls with which a defined line load is brought into the paper over the working width at exactly the right place. The Nipco roll consists of a stationary axis and a rotating sleeve that is covered with an elastic sleeve. The locally varying line load in cross-machine direction is produced by a multitude of support elements that

press from inside against the roll sleeve and are supported at the stationary axis via the hydraulic oil. The hydraulic oil pressures under the support elements can be individually set so that the desired line load distribution is produced in the nip.

### The principle of the new solution

The principle consists in piezo-actuators being used for targeted elimination of the dominant barring frequencies.

Piezo-actuators are also used in cars for injection nozzles with modern diesel motors, among other things. Fig. 3 shows the structure of the modified support element with the integrated piezo-actuator. There are 32 support elements installed with piezo-actuator in the Nipco roll.

- The active principle consists of a superimposition of inversely phased pressure oscillations (interference).

- The piezo-actuators produce a high-frequency controlled pulsation of the chamber volume under the support element via the pressure plate.
- A sensor support element delivers a control variable (acceleration) for several adjacent actuator support elements.
- The control algorithm developed can suppress several barring frequencies simultaneously.

If acceleration is detected in the critical frequency range with the sensors, then an exactly opposed pressure pulsation is introduced in real time via the piezo-actuators. Through this, wear in the case of barring is inhibited from the very beginning. That is the advantage of an active system. If the inversely phased pressure pulsations are brought directly into the nip with the correct frequency already at the beginning of the wear process – thus, immediately after the roll change – then the development of barring is suppressed over the long term. Fig. 1 shows the modified axis of the opened

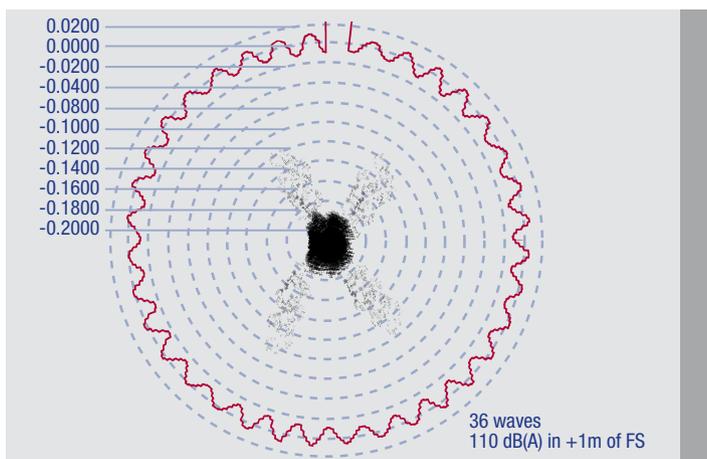


Fig. 2: Example of a concentric running test with high resolution.

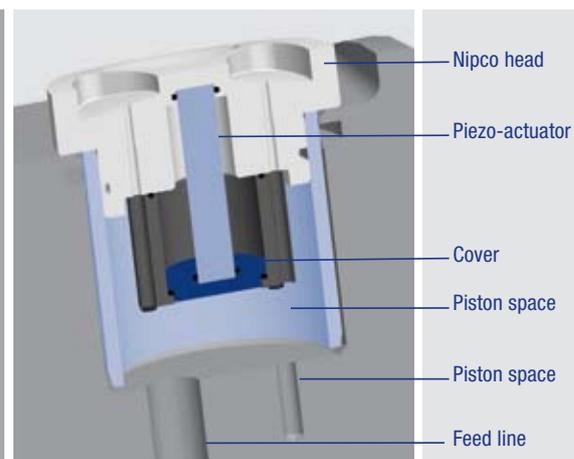


Fig. 3: Support element with piezo-actuator.

**Technical specifications**

**EcoSoft calender – August Koehler GmbH in Kehl, PM 2**

Working width:	4,200 mm
Speed:	1,600 m/min
Paper grade:	thermo-base paper
Basis weight:	40-80 g/m <sup>2</sup>
Line load:	80-150 N/mm
Surface temperature:	60-80° C



Fig. 4: Technical specifications of the active Nipco roll at August Koehler GmbH in Kehl, PM 2.

Nipco roll with the additional electrical connections. Fig. 4 shows the installed active system on the EcoSoft calender of the PM 2 at August Koehler GmbH in Kehl. Outwardly, only the two additional electrical plug connections can be seen; roll handling itself hasn't changed. The required energy demand is low: the installed overall infeed for all piezo-actuators together amounts to only 7.5 kW.

**Getting active – lengthening the roll's service life**

The active system is demonstrably effective. If the controller is switched

off for a short time, then within minutes a natural mode forms at 670 Hz (49-fold) which without active control makes disassembly of the roll necessary after 20 days.

With active control switched on, this frequency is almost completely suppressed. The service life of the active Nipco roll was thus more than doubled.

**Outlook and further developments**

Barring on calenders has lost its ability to scare the paper maker and

also the mechanical engineer and plant engineer. Meanwhile, there are customized solutions so that this vibration phenomenon no longer burdens the daily production routine. The active system has by now been in continuous operation for two years and has proven itself industrially from the very first day. So far there have been no failures, which also shows the durability of the individual mechanical and electrical components. The system can be used universally for deflection compensation rolls with support elements and is not limited to just Nipco rolls. And it can be easily upgraded at a later date. Similarly effective active solutions have also been developed for middle rolls in multi-nip calenders.

**Contact**



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*“Since successful start-up, we’ve still had no failure of the system to record.”*

*Georg Streif, Production Manager PM 2/SM 2, August Koehler GmbH in Kehl*

*“At first, I could hardly imagine that we would achieve an improvement with this new technology - but it works. The active system has been in continuous operation at our plant for two years. We have achieved an enormous lengthening of the Nipco roll's service life. Handling during roll change is trouble-free. Since successful start-up, we've still had no failure of the system to record. Other negative influences could not be detected. I can strongly recommend the system. It is a good solution for lengthening service life.”*

Important future market for Voith

## Joint visit of the Voith Group Executive Board to China

At the beginning of March, all Executive Board members jointly visited the Middle Kingdom in order to see first hand the economic situation in China and the situation of the Voith companies there.



Visiting the Dagang plant: Dr. Hans-Peter Sollinger (third from left) and Dr. Hubert Lienhard (fourth from left) receive a briefing using a model of the plant facilities. They were accompanied by Mingming Liu, Chairman of Voith Paper China (third from right).

Along with a board meeting in Shanghai, joint visits to the Voith locations were on the agenda.

In addition, Dr. Hubert Lienhard, Chairman of the Board at Voith AG, and Dr. Sollinger, Chairman of Voith Paper, used the occasion for a visit to Dagang with an inspection of the fine paper machine that Voith delivered – the largest one in the world. Dr. Hubert Lienhard agrees

with his board colleagues that Voith is on the right path in China: “In the past few years, Voith has made great progress in the integration of all corporate divisions in the Chinese and Asian markets and with their anchoring there.” Voith delivered its first paper machine to China over 70 years ago. Today, Voith Paper City in Kunshan is the center for all paper activities in the entire Chinese market.

Currently, around 2,000 people work for Voith at a total of 24 locations in China. They generated around 660 million euros in sales in the past fiscal year. A balance in the Middle Kingdom is very impressive and at the same time inspires us in our future work. For Dr. Hubert Lienhard, one thing is clear: “An important goal in the coming years is to further expand the integration of Voith in China. In that way, we can better support our customers on site.”

## Success at Rhein Papier in Hürth

# New world record for newsprint

Rhein Papier has set a new world speed record for newsprint on PM 1 at their mill in Hürth, Germany.

On 10th March 2009, an average speed of 2,010 m/min was achieved over a

period of 24 hours during the production of standard newsprint with a basis weight of 42.5 g/m<sup>2</sup>. The time efficiency was around 95.2%. Over a period of 20 hours even a maximum speed of

2,015 m/min was reached, which shows the potential of this machine.

This new world record is the result of the efforts made by Rhein Papier to further optimize the machine with respect to productivity and runnability. PM 1 went on stream in July 2002 and produces newsprint from 100% recovered paper in a basis weight range of 40-52 g/m<sup>2</sup> on a wire width of 8,900 mm. This is a machine with a DuoFormer TQv, a Tandem NipcoFlex press, a TopDuoRun dryer section, an EcoSoft calender and a Sirius reel. The machine concept of the Voith paper machine was drawn up based on the proven One Platform Concept.



*The successful world record team in Hürth.*

## QualiFlex – double anniversary

# 5,000 press sleeves in 25 years

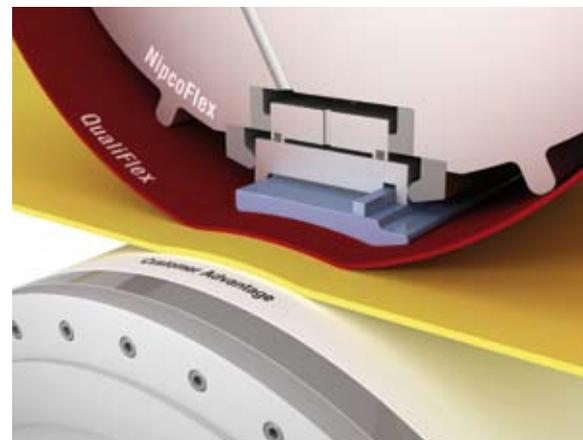
In the area of press sleeves, Voith Paper is celebrating an anniversary twice in 2009. On the one hand, the 5,000th QualiFlex was delivered to a customer in Bosnia-Herzegovina; on the other hand, industrial production of press sleeves for closed shoe presses began 25 years ago. During this period, press sleeves that were always high-quality were delivered for the constantly growing number of shoe presses – already over 700 presses have been sold to date.

Through continuous development of new materials and surfaces and the right selection suitable for the respective intended use, the users were always given the optimum

characteristics. The result is numerous world records regarding machine speed, production rates, energy efficiency and running times on the most varied paper and board machines, regardless of manufacturer. Over the years, the market share was expanded to about 40%, as was the position as clear market leader in this segment. Today more than ever, QualiFlex is again and again setting new standards by which the performance of press sleeves is measured.

Along with continuous further development and optimally proven production methods, one basis of this success is also extensive knowledge.

“The goal for the coming years will be to continue to have solutions for optimum results of our customers through continuous development in all areas,” explains Herbert Reil, General Sales Manager for QualiFlex.



Pumped storage power plant sets new standards after commissioning

## An ideal supplement to wind energy

**Pumped storage plants are ingenious hybrids. They can produce electricity in turbine mode, or store energy when in pumping mode. Here, the new pumped storage plant, Kops II, in Austria is setting new standards: Within seconds, it can feed up to 180 MW of energy into the grid during peak loads, or remove up to 150 MW of unused energy from the grid for storage. Kops II has been connected to the power grid since the beginning of 2009.**

The Kopswerk, located in Austria's Vorarlberg mountains, is one of the largest pumped storage plants in Europe and the largest power station in the network of Austrian energy provider, Vorarlberger Illwerke. Kops II supplies so-called "regulating energy" to the European market. As a result of the increasing utilization of intermittent wind and solar energy, there is also a rise in demand for balancing energy that has to be available within only a few minutes.

Kops II has three machine sets, each rated at 150 MW for pumping mode and 180 MW for turbine mode. Each set consists of a Pelton turbine, a motor generator, a starting converter, and a storage pump. For good reasons, Kops II uses separate machine sets with individual pumps and turbines rather than conventional pump-turbines: The machine sets are designed to operate with short hydraulic circuits, while the storage pump and the turbine can operate simultaneously. A certain amount of water is channeled to the turbine and generates electricity. As a result, the machine set is able to absorb just the amount of electricity available from the grid. The pump always works with 150 MW. If the grid provides only 100 MW of excess capacity, the turbine is fed with exactly the amount of water, which

is necessary to compensate for this 50 MW difference.

Depending on the actual demand, up to 180 MW of energy can be fed into the grid within seconds during peak turbine operation, while up to 150 MW of surplus energy can be removed from the grid during pumping operations. Thanks to its short hydraulic circuit, Kops II can vary its operating modes to produce a turbine output of 180 MW or 150 MW of pumping power –

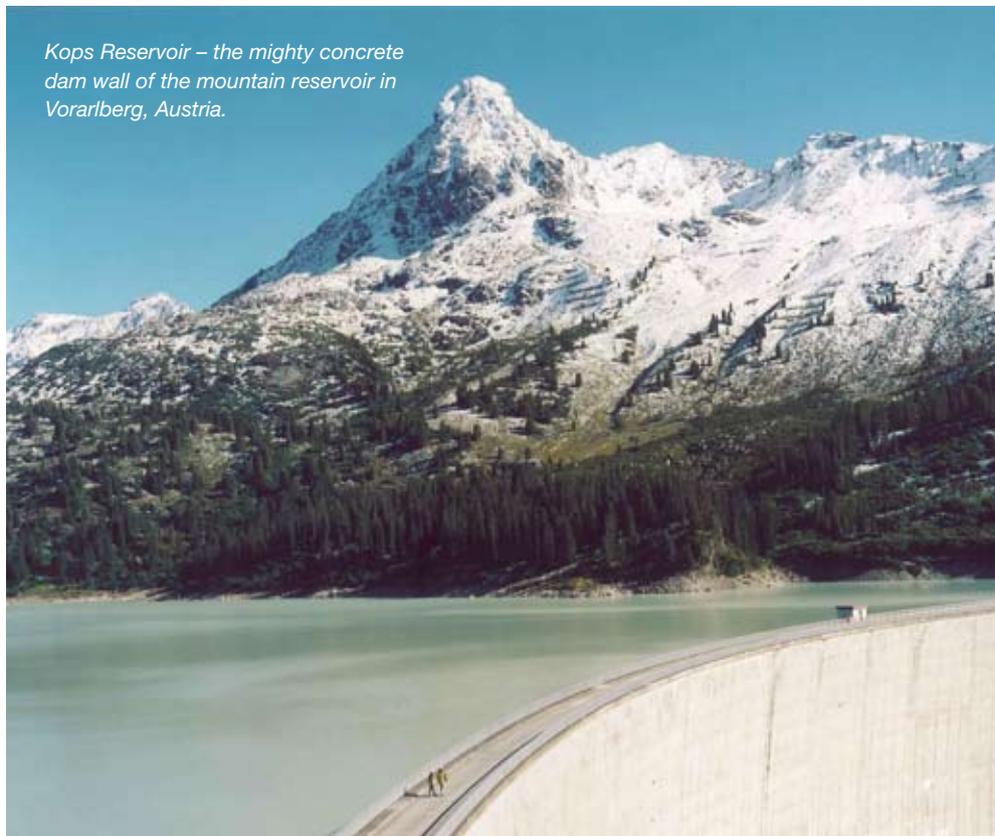
thereby adapting perfectly to the grid's current load requirements. This also means that wind power stations can be more efficiently supported, because fluctuating wind speeds produce either too much or too little electricity.

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*Kops Reservoir – the mighty concrete dam wall of the mountain reservoir in Vorarlberg, Austria.*



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**Instead of disposal,  
generate energy**